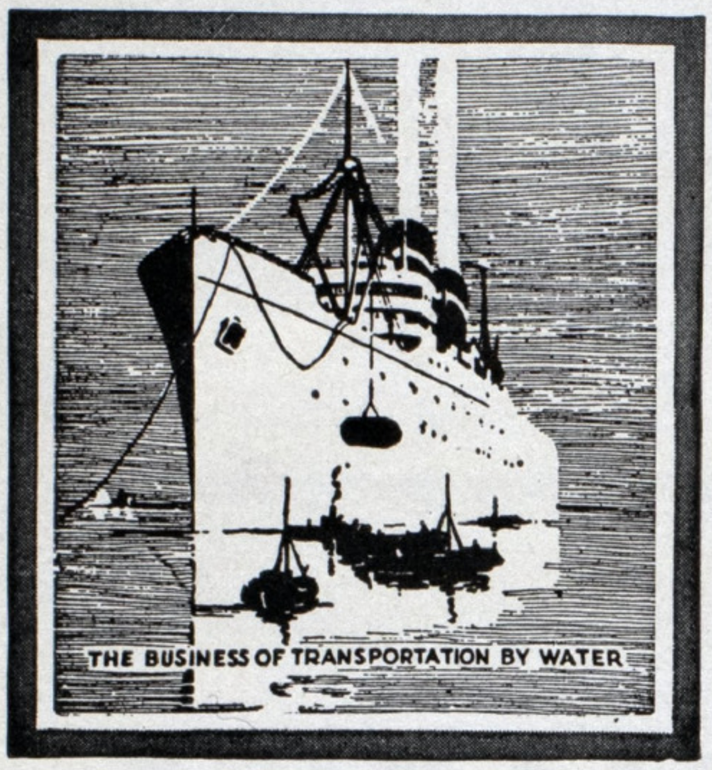
Marine Review

The National Publication Covering the Business of Transportation by Water

CLEVELAND FOUNDED 1878 NEW YORK



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A. H. Jansson, *Editor*
H. O. Taylor, *Advertising Manager*

Chicago Office, 1347 Peoples Gas Bldg.
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London Office, Caxton House
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« EDITORIAL »

Ratify the Convention for Safety of Life at Sea

THE international convention for the safety of life at sea agreed upon in London, 1929, should be ratified by the United States. It is hopeless to expect each individual, whether he be a member of congress or a private citizen, to familiarize himself with all of the manifold technical factors incorporated in this convention. He has neither the qualifications nor the time for doing so. We must trust the judgment, the good faith and the thoroughness of the able representatives of the United States who helped to formulate and agreed to the terms of the convention. No one can justly criticise either the ability or the integrity of these men.

Let us ratify the convention for the safety of life at sea and thus bring its provisions into effect. Without such ratification this valuable work in the cause of safety is inoperative in international trade. It doesn't seem reasonable that we should through inertia, lack of interest, or unfounded suspicion of its terms, fail to take the necessary action to put the standards of the convention into effect in order to reduce the dangers to life and property afloat.

Rear Admiral J. G. Tawresey, C.C. U.S.N. retired, one of the American delegates, recently prepared a careful analysis of the terms of the convention with reasons for its ratification by the United States and a reply to some of the criticisms. No fair-minded person can read the admiral's able summary without feeling that our own interests are amply protected in every respect, that we owe it to ourselves and to our fellow human beings in the world to promptly agree to the convention and thus increase the safety of life at sea.

Responsibility for Naval Contracts

FROM one of the sections in the house of representatives bill for naval construction introduced by Representative Carl Vinson of Georgia, chairman of the house naval affairs committee, it is clear that the secretary of the navy does not take kindly to the review of naval contracts by the comptroller general.

Section 2 of that bill directs that whenever the secretary of the navy enters into a contract for the construction of any vessel or engine, such contracts shall be awarded on terms prescribed by him to the bidder that in his judgment can satisfactorily perform the work or the service required to the best advantage of the government. And here comes the nub of the matter. "The award of such contract by the secretary of navy, the interpretation of the provisions of the contract and the application and administration of the contract shall not be reviewable by any officer or tribunal of the United States except the President and the federal courts."

This seems reasonable. It places the responsibility under the law directly where it belongs on the head of one of our long established departments of government. At the same time it fully protects anyone, who in his dealings with that department may feel that he has not received a square deal. He can appeal to the federal court in his district or to the President of the United States.

Stevedoring Charges in Great Britain

IN THESE days more than ever it is necessary to examine carefully all expenses in connection with shipping. The shipowner, in many instances has no control over outlays required. In Great Britain, where some things are better done than we manage here, this state of affairs is receiving the attention of the proper authorities as illustrated by the investigation of stevedoring charges recently completed by a committee of the council of the chamber of shipping of the United Kingdom. This committee was appointed in October, 1930, to investigate stevedoring charges throughout the country to ascertain whether there was generally speaking a disproportionate margin between the prices charged by the stevedore to the shipowner and the cost of labor involved.

At first the committee investigated the cost of discharging, cost of labor and local customs

at the principal ports of the United Kingdom for such commodities as cereals, ore and wood to determine whether the difference between the cost of labor and the amount paid by the shipowner was excessive. As a result the committee suggested a fair basis of stevedoring charges for these classes of cargo under ordinary circumstances. It was found that at some ports the current stevedoring charges were below the standard which the committee thought not unreasonable. At many other ports it was found that there was not an excessive margin between the amount charged to the shipowner and the labor cost for discharging. On the other hand it was found that where the work of discharging is in the hands of a monopoly of stevedores or in some cases of a port authority, the general level of stevedoring prices was high.

Following up its investigation the committee submitted a report which was unanimously adopted by the chamber of shipping. To show the effect of such an impartial investigation an amicable agreement has been concluded between port labor employers and employes for a reduction in wages to take effect from the beginning of this year. On this basis shipowners may expect a proportionate immediate reduction in stevedore charges generally in addition to the reduction which the report indicates is called for in certain localities due to what is considered excessive stevedoring profits. Thus by a thorough study of the situation the shipowner is saved undue expense at a time when cargoes are scarce and profitable operation even when cargoes are offered is limited and only possible under the most economical and careful operation.

Extend Time on Shipping Loans

IN VIEW of the present emergency, whatever steps may be necessary should be taken to continue the established government policy of support and encouragement to private agencies in building up an American merchant marine, adequate in size and efficient in operation. Congress should and will undoubtedly act promptly and favorably on the request of T. V. O'Connor, chairman of the shipping board for a moratorium on loans to aid American shipping interests. The present law calls for a 20-year period for the repayment of loans. Under present conditions with every item of expense reduced to a minimum, shipping lines still find it impossible to lay by sufficient reserves for new building and the repayment of loans to say nothing of profits. Even in normal times conditions are not favorable for private financing of ship property, much less is it so now.

Chairman O'Connor is performing his duty in protecting the gains made in our merchant marine by laying before congress all of the facts of the serious situation faced by American operators who have bought shipping board lines and who have built and are committed to build modern vessels for these services. He does not want to start taking these lines back as he will be forced to do if payments are defaulted either on the purchase price or construction loans.

Whenever necessary and after careful investigation the shipping board should be allowed to extend the time of payments in order to help over this period of slack business. The law will have to be amended to make this possible. It is urgent that this be done. As the chairman pointedly puts it, "If we ever start to take one line back it will just start a parade—we are going to have to take many lines back." We don't want that kind of a parade. It would be like hauling down the flag and surrendering our legitimate right to an American merchant marine.

Arbitration in a Maritime Case

THE Supreme Court of the United States in a recent decision unanimously upheld the constitutionality of the United States arbitration act. This particular case rose out of a maritime transaction. Arbitration had been ordered and the award had been confirmed both by the district and circuit courts. In an appeal taken to the Supreme Court the constitutionality of the arbitration act was questioned as well as the interpretation of certain of its provisions.

The Supreme Court decision held that the arbitration act making valid provision in maritime contracts for the arbitration of disputes and authorizing courts of admirality to enforce the awards of the arbitrators is constitutional, and further, that an arbitration clause in a maritime contract, which provided that the award of the arbitrators should be "final and binding," authorized an admiralty court to enter its decree upon the award, although the contract for arbitration did not in turn provide for the entering of a decree upon the award. It was also held that an award signed by a majority of the arbitrators was binding.

This decision is of the utmost importance to maritime interests who may in the future be guided accordingly.

S. S. MARIPOSA

New Matson Liner Sails on Maiden Trip

First of Three Passenger and Cargo Ships—Twin Screw—
Turbine Reduction Gears—Top Speed, Trials, 22.84 Knots

SAILING from New York on her maiden voyage Jan. 16, the MARIPOSA is the first of three sister vessels building for the San Francisco-Australian service of the Matson Navigation Co. This vessel, costing about $8,000,000, is the latest addition to the American merchant marine under the provisions of the Jones-White act, probably the most constructive marine legislation enacted in this country in a generation.

The Matson Navigation Co. was organized in 1901 to take over the business of Capt. William Matson who in 1882 founded the Matson line with a small schooner, the EMMA CLAUDINA, a vessel of some 200 tons. Many ships have since been added to the fleet whose names are a household word on the Pacific coast and in the Hawaiian Islands. Of these names particular sentiment is attached to the LURLINE, the name to be given the third of the present group, since the first ship built to Captain Matson's order was the brigantine LURLINE; this was also the name of the first steamship built to his order in 1908.

Becomes Owner of Oceanic Line

In 1926 the Matson line purchased the Oceanic line whose three steamers, the SIERRA, SONOMA and VENTURA, are now in the South Seas and Australia service between San Francisco, Hawaii, Samoa, Fiji islands, New Zealand and Australia. The MARIPOSA, now on her way to enter this service, will be followed by her sister ship, the MONTEREY, upon completion.

The present flagship of the Matson fleet, the MALOLO, built at the famous Cramp shipyards, was placed in service in 1927.

In conjunction with the American Hawaiian Steamship Co., the Matson line formed in 1928 the Oceanic & Occidental Navigation Co., operating some 20 freighters. One-half of these are operated by the Matson line serving Australia and New Zealand; the American Hawaiian Co. operates those in the Oriental and Philippine service.

November, 1930, marked another step in the development of this great company for during that month a consolidation went into effect with the Los Angeles Steamship Co., thus including Los Angeles in the schedule of the Matson line Australian services as well as San Francisco.

Such is the operating background behind the trio of new ships headed by the MARIPOSA, new Queen of the Pacific. The company's traditions are ably carried on by W. P. Roth, president, A. C. Diericx, vice president, and his assistant, G. K. Nichols, who are the leaders in the development of these magnificent new vessels.

General Particulars

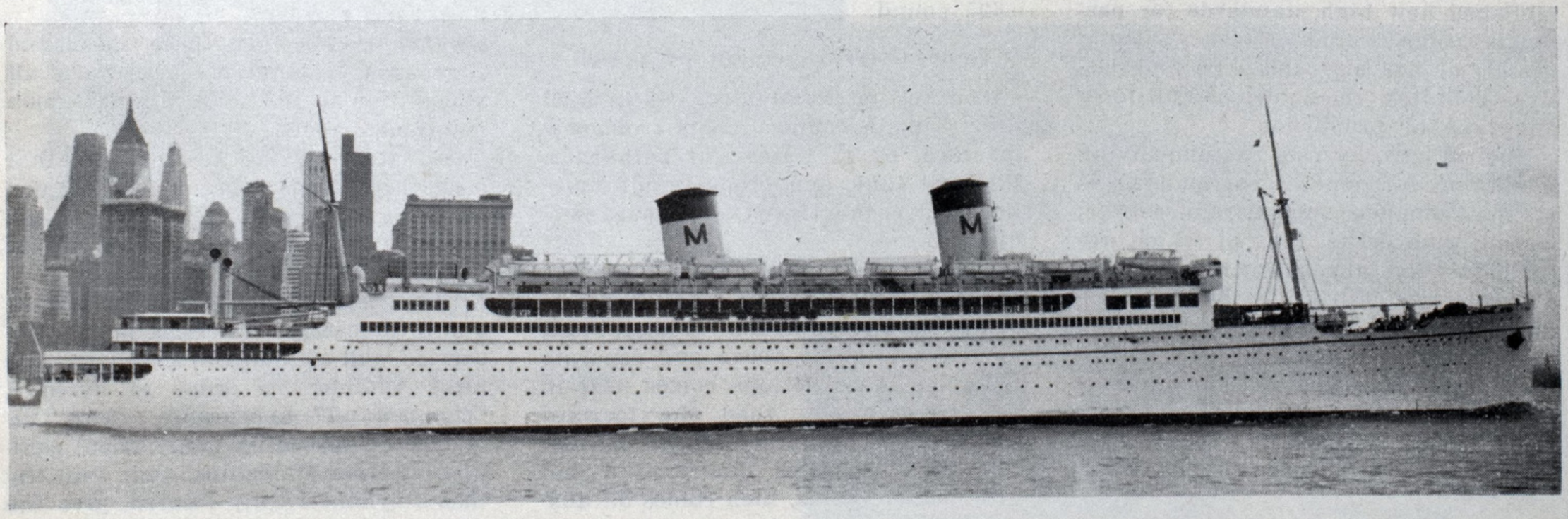
Twin Screw S. S. Mariposa

Owner	Matson Navigation Co.
Builder	Fore River Plant, Beth. S. B. Corp.
Contract signed	Oct. 25, 1929
Keel laid	June 11, 1930
Launched	July 18, 1931
Sea trials	Dec. 10-11, 1931
Delivered	Dec. 14, 1931
Maiden voyage, sailed from New York	Jan. 16, 1932
Classification	American Bureau of Shipping
Length overall, feet, inches	631 6 5/8
Length on waterline, feet, inches	628 0
Length between perpendiculars, ft., in.	605 0
Beam, molded, feet, inches	79 0
Beam, extreme, over B deck, feet, inches	82 1 ½
Depth, molded to B deck, feet, inches	61 0
Depth, molded to C deck, feet, inches	52 9
Depth, molded to D deck, feet, inches	44 6
Draft, molded, to d.w.l., feet, inches	28 0
Displacement, to d.w.l., tons	26,141
Gross tonnage, United States	18,017.35
Net tonnage, United States	10,580
Cargo capacity, general, cubic feet	245,019
Cargo capacity, refrigerated, cu. ft.	34,629
Cargo capacity, baggage, mail, etc., cu. ft.	29,974
Fuel oil capacity, total, tons	6,606
Fresh water capacity, tons	2,439
Drinking water capacity, tons	430
Passenger accommodations, first class	475
Passenger accommodations, cabin class	229
Total passenger accommodations	704
Crew, total	359
Total persons on board	1,063
Shaft horsepower, normal, twin screw	22,000
Speed, in service, knots	20½

Some Facts About the Shipyard

The Fore River plant of the Bethlehem Shipbuilding Corp., located at Quincy, Mass., originated in 1883 with a small company known first as F. O. Wellington & Co., and later as the Fore River Ship & Engine Co. This company began by the manufacture of steam engines, their first being a 50-horsepower engine for a small passenger steamer, but in 1896 the first hull, that of the yacht SALLY, was constructed.

In 1915 the yard was acquired by the Bethlehem Shipbuilding Corp. and has been largely rebuilt and extended until it now comprises 14 building slips and is capable of handling the largest ves-



New Twin Screw Turbine Geared Liner Mariposa—Built for the Matson Navigation Co. for the San Francisco Australia Service by the Fore River Plant, Bethlehem Shipbu ilding Corp.—Sailed from New York Jan. 16

sels of any type merchant or naval.

Since its beginning this yard has produced almost every type of vessel, from carfloats and barges to one of the two largest vessels built in an American yard, the airplane carrier LEXINGTON, completed in 1928. These vessels include ferries, trawlers, freighters, bulk oil and coal carriers, yachts, sailing vessels, submarines, destroyers, battleships and passenger steamers of all kinds.

The shops and equipment are of the most modern type. The organization built up under the leadership of S. W. Wakeman, vice president, and H. E. D. Gould, general manager, stands second to none in the shipbuilding industry of the United States today, and is able to carry on the tradition of the old Bay State wherein were produced the flower of the American clipper ships in that glorious period of American leadership on the high seas.

These two companies, each with a solid background of experience and tradition, collaborated to produce this latest masterpiece of the shipbuilder's art and to this collaboration is due in no small measure the success of the vessel. When the owner and operator, knowing his problem, places the solution in the hands of a trustworthy and capable builder, surely success is assured.

Development of Design

Tentative plans and specifications for these ships were developed by the Matson company and its consultants, Hugo P. Frear, naval architect, and John F. Metten, marine engineer. Prices were obtained from various shipyards, the Bethlehem corporation, Fore River plant, being low bidder. Preliminary approval of these plans by the shipping board and navy department was then obtained and a mail contract awarded in due course. In conjunction with the Fore River plant technical staff final arrangement plans and detail specifications were prepared and a contract for the two vessels signed on Oct. 25, 1929.

The behaviour of the MARIPOSA on trial and her maiden trip to New York demonstrates that this vessel has established new high standards for passenger comfort and efficiency among vessels of her size and type and justifies definitely the choice of hull form and type of propulsion.

The MARIPOSA (see accompanying tabulation for general particulars) is of the complete superstructure type, having nine decks, four of which are for passengers almost entirely. She is a twin screw ship driven by single reduction geared turbines, steam being provided by watertube boilers in two firerooms. She has accommodations for 700 passengers. Her designed service speed at load draft is 20½ knots and her load displacement is 26,141 tons.

She is fitted for service as a naval auxiliary in time of war, subdivision being to excess of the requirements of the 1929 convention for safety of life at sea, particular study having been given to the matter of stability in damaged condition. In this connection also her steering gear is located below the waterline, and provision has been made for fitting of gun foundations should these be required. The extremely large fuel capacity of some 6600 tons provided should be of special value for naval service—the vessel being capable of making the round trip between San Francisco and New Zealand without refueling.

Hull, machinery and equipment have been built to the latest rules of the American Bureau of Shipping and under their survey, the vessel being classed *A1E A.M.S.

The design of the public spaces and staterooms, including decorations, was developed with special thought for the comfort of the passengers in tropical climates, the rooms being exceptionally large and airy, to give a particularly pleasing and cool effect.

Report of Trials at Sea

The official trials of the S. S. MARIPOSA were conducted on Dec. 10 and 11. The performance exceeded the contract requirements by ample margins. The trials consisted of 14 runs over the measured mile off Rockland, Me., at speeds varying from about 14 knots to maximum and a 12-hour full power endurance and economy run.

On standardization, for the mean of the three high runs, the speed was 22.27 knots at 132.1 revolutions per minute and 28,130 shaft horsepower; and the highest run was 22.84 knots at 132.5 revolutions per minute and 28,450 shaft horsepower.

During the economy run the ship was operated as in normal service with all heating, ventilating, refrigerating and galley equipment in use so far as practicable and with a generator load of 556 kilowatts. The average shaft horsepower was 22,113 at 124.7 revolutions per minute. During the last five hours of this run the oil consumption for all purposes per shaft horsepower of main turbines, corrected to 19,000 British thermal units, was 0.627 pound.

General Arrangement of Vessel

The hull of the MARIPOSA is divided into 13 main compartments from bow to stern, by 12 watertight bulkheads. Fuel oil tank and other minor bulkheads give, practically, still more subdivision.

This arrangement provides two large cargo holds forward; each hold is served by a large hatch. A large block of fuel oil tanks, above and separate from the inner bottom, comes next to the cargo space; then the forward boiler room. Another block of fuel oil tanks separates the forward and after boiler rooms, then comes an auxiliary machinery space in which are located pumps and generators and the like, and which is flanked by oil tanks at the side of the ship. The main engine room comes next, followed by refrigerating machinery space and fresh drinking water tanks. These tanks run aft beside the propeller shafts; then at the after end of the hold is a trimming tank. Refrigerated cargo space is provided aft; also space for a considerable amount of general cargo. Refrigerated ship's stores are near the refrigerated cargo and machinery space. Other ship's stores, laundry room, baggage spaces, mail room and tailor shop fill in where convenient on lower decks between the forward and after holds.

The main dining saloon, galley, pantries and cabin class dining saloon are located amidships on E deck—the first deck wholly above the deepest load water line. Decks D, C and B are given over mainly to staterooms. Deck A has ten de luxe staterooms forward, eight of which have "lanais" or private enclosed verandas. These rooms may be made up into suites as desired. The rest of A deck is given over to public spaces, and provides an extensive promenade, a library, a writing room, a large lounge, an extensive smoking room, a men's cluroom and bar, and a dance pavilion and palm garden which extends the full width of the ship and has large windows on three sides.

Exceptional Cabin Accommodations

On the boat deck, next higher than A deck, are the navigating spaces, officers' quarters, and radio room, in a house forward; accommodations for engineer officers and the officers' mess room amidships, and for the passengers, a well equipped gymnasium and an electric bath, as well as a large amount of promenade deck space. A tennis court is found on top of the house over the main lounge, and a large sport deck above the dance pavilion.

The cabin-class is given exceptionally fine accommodations, the staterooms here being as well appointed as those of the first-class. For the use of the cabin-class is provided a very comfortable and attractive lounge, a large and excellent smoking room, a veranda enclosed on three sides, and a generous amount of deck space, all in addition to the cabin dining saloon mentioned above.

A feature of the MARIPOSA is that each class of passengers has at its disposal a large open air swimming pool. Many awnings are provided for shelter in hot weather.

There is a short well deck forward and a forecastle. The deck houses are carried well aft and end gradually, one after another, in order to avoid a "chopped off" appearance. The two stacks are spaced far apart, about equidistant from amidships, and, with the masts symmetrically located, give the ship a very well balanced appearance.

Above the green boot-topping, the

Above, Main Lounge

Above, Dining Room

S. S. Mariposa
Interiors
First Class

Above, Service Bar, Dining Room

Above, Men's Club Room

Right, DeLuxe Stateroom

MARIPOSA is painted glossy white from stem to stern. A narrow band of blue follows the sheer line the full length of the ship. Other trim is blue and light buff, typical of the Matson line. Her well proportioned stacks are painted light buff with blue tops, and carry the large blue M of the owners. Deck house sides behind covered promenades and on the boat deck, and their ends, are painted light buff giving an appearance of dignity and neatness.

The stem is slightly curved, raking forward, and she has a nearly vertical cruiser type of stern. The hull is bossed out to enclose the shafts and shaft tubes.

Some Details of Construction

The hull of the MARIPOSA is built of steel. The framing is transverse, the side frames consisting of channels from the margin plate to F deck and from F deck to D deck, and angles above D deck. Frames are spaced 36 inches apart amidships, the spacing being gradually reduced toward the ends to 24 inches.

The double bottom is continuous from fore peak to aft peak bulkheads, and is fitted to carry fuel oil and water. Solid floors are fitted on every frame in way of the boiler and engine rooms, and forward of the three-fifths length; and on every third frame elsewhere.

Deck beams are fitted on every frame. Up to and including B deck, channels are used; above B deck, angles. All decks are completely plated except the boat deck, of which a portion is built with steel stringers and tie plates. All decks exposed to the weather in any part of the ship are planked with teak. In general, four lines of pillars or longitudinal bulkheads support the decks, with longitudinal girders arranged on the pillars under each deck at each line of support.

The ship is built without the use of expansion joints, B deck being the strength deck amidships and C and D decks at the ends. Over the greater part of the ship's length, the heavy side plating is carried up to B deck.

There is no tumblehome on the sides of these ships, the full molded breadth of 79 feet being carried up to B deck. On that deck the beams are extended to overhang the side of the ship by 18 inches either side; this increased width is maintained to the boat deck.

Bulkheads are arranged in a manner which assures that the ship will remain afloat, with sufficient stability to prevent flooding undamaged compartments, when at least two major compartments are open to the sea.

The stem was made up in four parts; the three upper sections are forged steel; the lower rounded part or forefoot, is a steel casting of a shape which fairs into the slightly bulbous form of the ship's bow.

The major portion of the stern frame is of cast steel in one piece, the rudder being carried on a single gudgeon and a large rudder stock bearing. A small casting forms the corner of the stern at the extreme after end of the ship.

The rudder is of the balanced, streamline type, having a cast steel frame with some structural stiffening and support for the side plates. It is carefully faired, and its greatest thickness is no less than 2 feet. The rudder stock is one piece of cast steel, 2 feet diameter outside with a 10-inch core, shaped at the lower end to form a large horizontal coupling to the rudder frame.

A pipe passage runs fore and aft through the oil tanks between the boiler rooms for the purpose of carrying steam and other piping as well as for access; and a smaller tunnel runs through the forward oil tanks to carry piping for oil and to the forward double bottom and fore peak tanks.

Access through watertight bulkheads between compartments is obtained by steel watertight doors, 32 in all, located on and below C deck; 20 of these doors are of the horizontal sliding type electrically operated.

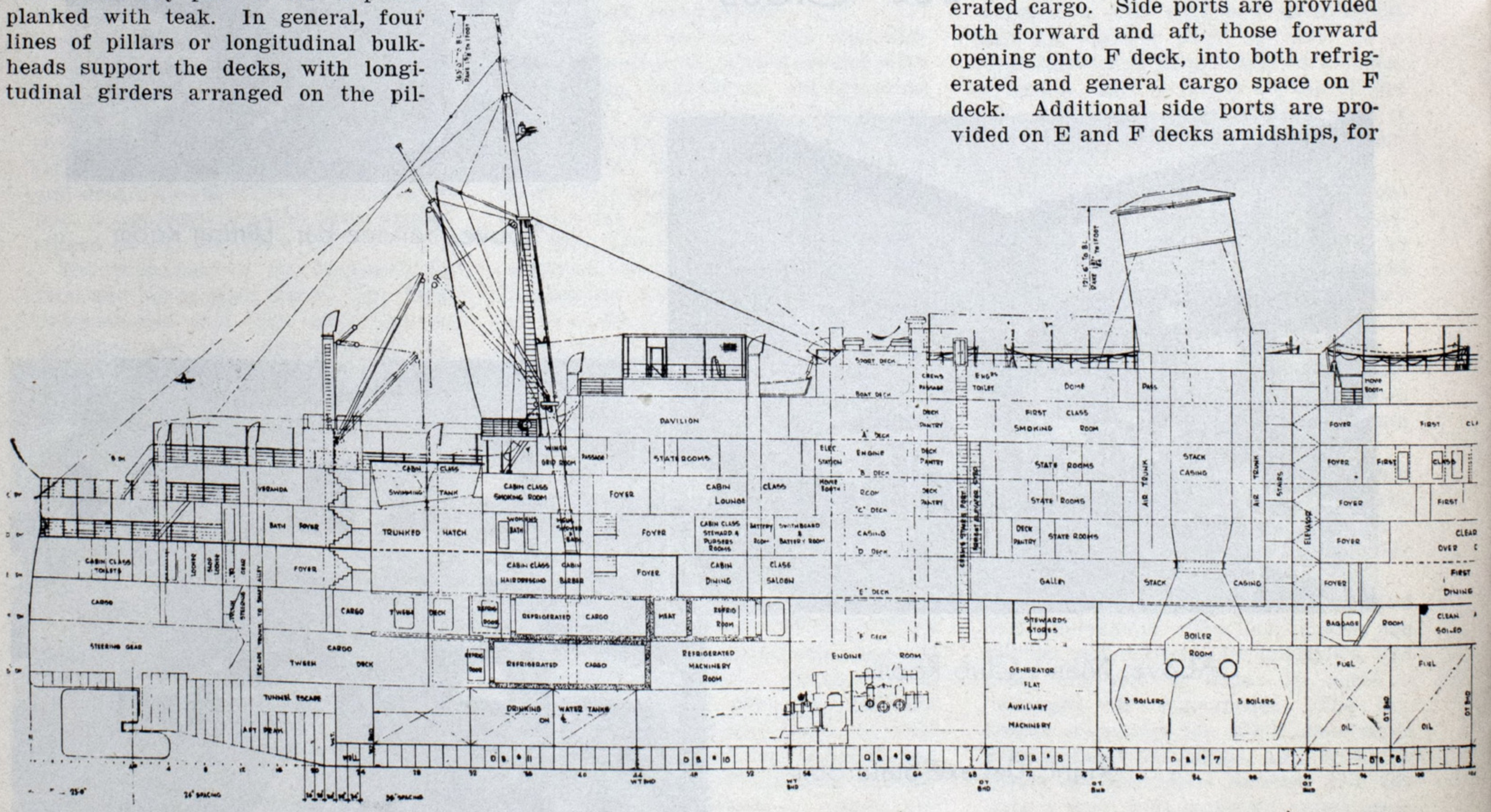
Masts are of steel, built up and riveted. Cargo booms are of steel tubing.

A feature of the MARIPOSA is that the side plating of the hull is insulated with cork slabs in way of passenger accommodations, the entire length of passenger space on C and D decks being so insulated; also in way of the dining saloons and cabin passenger space on E deck. On the boat deck, the sides of the deckhouses enclosing deck officers' and engineer officers' quarters, gymnasium, and electric bath are similarly treated. These cork slabs are 1 inch thick and are permanently fastened to the plating, and are in general covered by ornamental sheathing in quarters.

This insulation, together with the white paint on the entire outside of the ship above water, should provide comfort in the hottest weather as well as freedom from moisture due to condensation.

Cargo Handling Arrangements

The MARIPOSA is equipped to carry general cargo, automobiles, and refrigerated cargo. Side ports are provided both forward and aft, those forward opening onto F deck, into both refrigerated and general cargo space on F deck. Additional side ports are provided on E and F decks amidships, for



Inboard Profile of the New Matson Liner Mariposa. Subdivision is in Excess

baggage, mail and stores; and the entrances for passengers and crew. Still others are located on C and D decks for passenger entrances.

Hatches on deck serve each of the two forward holds, being carried as trunks through the crew spaces on C, D and E decks. The upper part of No. 2 hatch, which extends to B deck, is utilized as a swimming pool for first-class passengers, watertight steel hatch covers being fitted about on the level of C deck and proper filling and drainage connections being made above. Aft, the cargo is carried on F and G decks, and is handled through a hatch from B deck. This hatch is also used for a swimming pool, in this case for cabin-class passengers.

Cargo booms are fitted as follows: On the foremast, four booms of 5-ton capacity each and one of 30-ton capacity; on the mainmast, two of 5-ton capacity each. In addition, two 5-ton booms are fitted on the forward end of the deck house, over No. 2 hold. Aft, two kingposts are fitted, one at each side of the ship, each having a 5-ton boom serving the after cargo hatch.

In general, all 5-ton booms will be fitted with a single whip to handle loads up to 3 tons; double whips will be carried, however, to enable any boom to care for loads up to 5 tons.

Electric Drive Cargo Winches

All cargo winches are electrically driven, with controls placed where each operator can run two winches and still see down into the hatch where those winches work. Winches were made by the Allan Cunningham Co., Seattle, and are driven by Westinghouse motors. Two of the winches are of the double reduction geared heavy duty type for use on heavy loads on the 30-ton boom; the others are of single geared high speed type. All winch motors are rated at 35 horsepower at 300 revolutions per minute and are watertight.

Cargo blocks and fittings were furnished by the Boston & Lockport Block Co.; wire rope was made by the Williamsport Wire Rope Co.

All cargo gear is made in accordance with the stringent regulations for cargo handling of the Australian government, which require each part to be marked with the load to which it has been tested and gear to be so arranged that frequent inspection of all gear is possible, and that certain steel parts can be removed periodically for annealing.

Mail is carried in a large room set aside for the purpose on F deck between No. 2 cargo hold and the forward boiler room. Side ports are provided in this space for ready transfer of mail at distributing points. In a portion of this space there is a strong room for the storage of specie.

The most modern equipment has been installed. A complete Sperry gyro-compass is provided, with master gyro-compass and controls in an electric station on the boat deck, and repeater compasses in the wheel house, captain's room, radio compass room, bridge wings, port and starboard, on the flying bridge, and in the steering gear room. A gyro-pilot is installed in the wheel house, and is of the double unit type.

Ten-inch standard compasses, furnished by the Kelvin & Wilfrid O. White Co., are fitted in customary locations, one in the wheel house and one on the flying bridge.

A Sperry course recorder is installed in the chart room. A self synchronizing Sperry rudder angle indicator system is installed, with repeaters in the wheel house, engine room, and steering gear room. There is also a Sperry shaft revolution indicator system, with indicators in the wheel house and engine room and an electric comparator for indicating the comparative speeds of the shafts at a glance.

Additional Navigating Equipment

The latest type of Fathometer made by the Submarine Signal Co., Boston, is installed. This device gives a continuous record of the depth of water in which the ship is running.

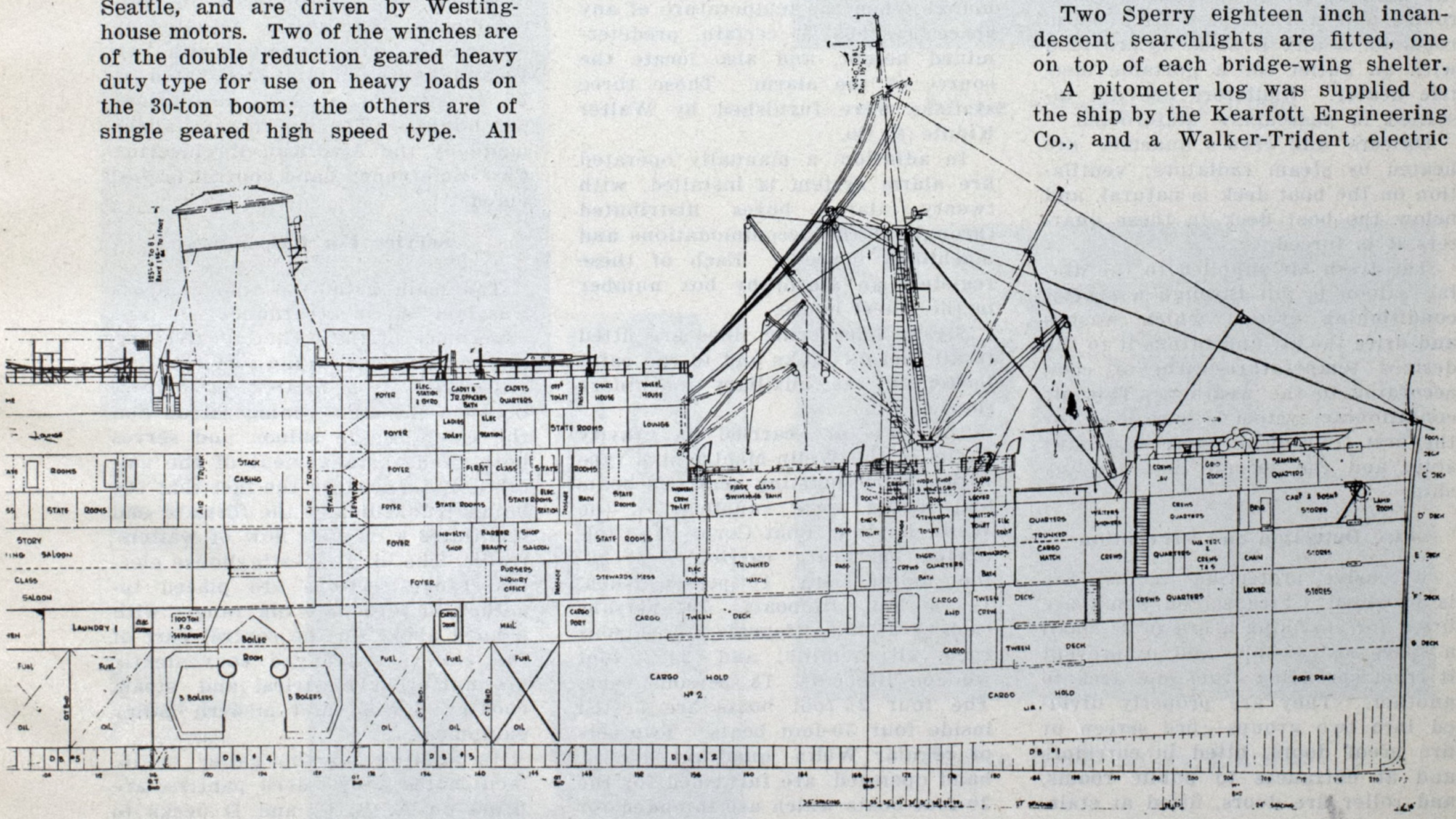
Two Lietz sounding machines, motor driven, are fitted, one on either side of the navigating bridge.

Engine, docking, and steering telegraphs are of the latest alternating current navy type, and were made by Charles J. Henschel & Co. Inc. They consist of combined engine order transmitters and indicators for each shaft at each side of the wheel house, with repeat-back indicators at each throttle valve; docking telegraph with similar repeat-back indicators taking orders from the bridge to the docking station on D deck aft; and a steering order telegraph with transmitter in the wheel house and indicator in the steering gear room.

A fire room telegraph of the same make and type is installed to take orders from the central gage board in the engine room to indicators in each fire room. Repeat-back indicators are fitted to these also.

Two Sperry eighteen inch incandescent searchlights are fitted, one on top of each bridge-wing shelter.

A pitometer log was supplied to the ship by the Kearfott Engineering Co., and a Walker-Trident electric



of the Requirements of the Convention for Safety of Life at Sea, London (1929)

log, by Kelvin and Wilfrid O. White Co.

Two Kent clear-view screens, consisting of a rapidly rotating disc of glass, were furnished by the Charles Cory Corp., and are installed in the wheel house.

McNab automatic electric whistle controls with secondary mechanical control are provided for both whistle and siren.

For hand steering from the wheel house, McLeod hydraulic telemotor control is fitted. An emergency control is fitted in the steering gear room.

The radio equipment is of the latest type, and includes radio direction finder, radio transmission and receiving sets, and ship-to-shore radio telephone equipment. A radio-operated clock is installed in the radio operating room. The transmitting set is of 500-watt size. The radio equipment was furnished by the Radiomarine Corporation of America.

Pneumercators are fitted to all oil and drinking water tanks, and to other water tanks under the refrigerated cargo space where sounding is difficult. These instruments were furnished by the Pneumercator Co.

The ventilating and heating system supply to each stateroom and to all public rooms fresh warm or cool air, the temperature at all times being controlled by passenger or steward. This fresh air is supplied under pressure at rates sufficient to change the air in each space in times varying from three to six minutes, according to the use of the space. Exhaust fans are also connected to the galleys, public lavatories, storerooms and workshops. Each stateroom on A and B decks is provided with an outlet for a portable electric heater. Radiators are not installed in passengers' staterooms.

Officers' and crew's quarters are heated by steam radiators; ventilation on the boat deck is natural, and below the boat deck in these quarters it is forced.

The fresh air supplied to the dining saloon is put through a special conditioning system which washes and dries the air and brings it to the desired temperature-warm or cool, according to the weather. This air conditioning system is here used for the first time on an American built ship, and the second time on any ship.

Fire Detection and Prevention

Extensive protection against fire is provided. Fire screen doors are fitted for confining a fire to as small a space as possible, and to prevent it from spreading from one deck to another. They are properly divided into two groups—fire screen or fire proof doors, fitted in corridors and at entrances to public rooms, and roller fire doors, fitted at stairways. Of the first group, fire screen doors, 30 are fitted in passenger spaces. These doors are in many cases designed to harmonize with the surrounding decorations. Several of them are even fitted with glass panels, a special type of glass passed by the fire insurance underwriters being used. Of the roller fire door type, 14 are installed, in general at the landings on each deck at each main stairway. Normally, these doors are rolled up into casings in the tops of the door frames, and thus disappear entirely from view.

A fire main, carrying water under pressure, is fitted throughout the ship, with hydrants installed in a manner which permits all parts of the ship to be reached with a short length of hose. In all, 92 hydrants are fitted. Connections are made to the fire main for filling the swimming tanks.

Fire Detecting and Extinguishing

Hand fire extinguishers of the chemical type are provided throughout all parts of the ship.

The Rich fire detecting system is installed in cargo spaces, storerooms, and other parts of the ship; and the Lux carbon dioxide fire extinguishing system is installed to cover boiler rooms, cargo holds, oil filling stations, paint lockers, lamp room, and storerooms. A Selex automatic electric fire alarm system is also installed, with thermostats in every stateroom and in every other compartment not protected by the Rich system. These thermostats give an alarm in the wheel house and in the engine room and engineer's lounge when the temperature of any space reaches a certain predetermined height, and also locate the source of the alarm. These three systems were furnished by Walter Kiddle & Co.

In adidtion, a manually operated fire alarm system is installed, with twenty alarm boxes distributed throughout the accommodations and machinery spaces. Each of these registers an alarm by box number in the wheel house.

Steam smothering lines are fitted to all fuel oil tanks and to the paint locker in the auxiliary machinery room.

Lifeboats are carried on gravity davits of the Welin-MacLachlan type with electric hoisting gear. All boats and davits were supplied by the Welin Davit & Boat Corp. The following boats are carried: 2 26-foot motor boats, 10 persons each, 14 30-foot lifeboats, 70 persons each, 4 26-foot lifeboats, 40 persons each, all metallic; and 2 20-foot wooden lifeboats, 18 persons each. The four 26-foot boats are nested inside four 30-foot boats. Two sets of regular Welin quadrant davits, hand operated, are furnished for the 20-foot boats which are intended for use as workboats. The motor lifeboats are provided with cabins and radio outfits.

Anchors are supplied as follows: two bower anchors, 17,150 pounds each; one spare bower anchor, 14,595 pounds; one stream anchor, 6195 pounds. These anchors were made by the Baldt Anchor Chain & Forge Corp.

Anchor cable, of National Malleable & Steel Castings Co. make, consists of 165 fathoms of 3⅛-inch stud link chain for each of the two bower anchors. One hundred and twenty fathoms of 5½-inch circumference steel wire streamline and 150 fathoms of 7½-inch circumference steel wire tow line were furnished by the Williamsport Wire Rope Co.

The windlass is of the horizontal spur geared type, made by the Bethlehem Shipbuilding Corp. Ltd. Dual electric motor drive with Westinghouse motors of 50 horsepower each at 600 revolutions per minute is used.

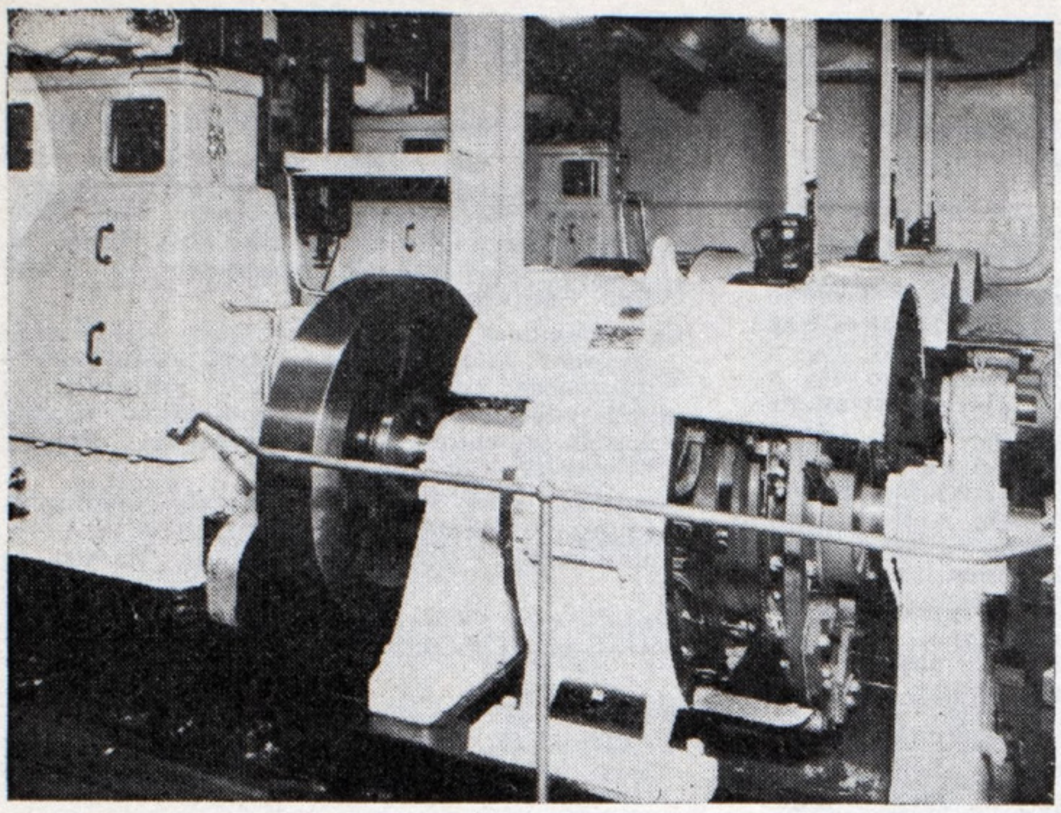
On the forecastle also are two capstan heads, with the machinery on the deck below. Two more capstans with motors in one unit on a common bedplate are installed on D deck aft. All these capstans are of American Engineering Co. make, and are driven by Westinghouse watertight motors of 75 horsepower each at 600 revolutions per minute.

The steering gear is of the hydraulic ram type, having four single-end cylinders arranged fore and aft at a slight angle to conform to the shape of the hull. Two cylinders are aft and two forward of the tiller, to which they are connected by sliding blocks. The gear is actuated by electrically driven pumps, with two Westinghouse motors each rated at 75 horsepower at 400 revolutions per minute. The steering gear was made by the American Engineering Co. Emergency hand control is provided.

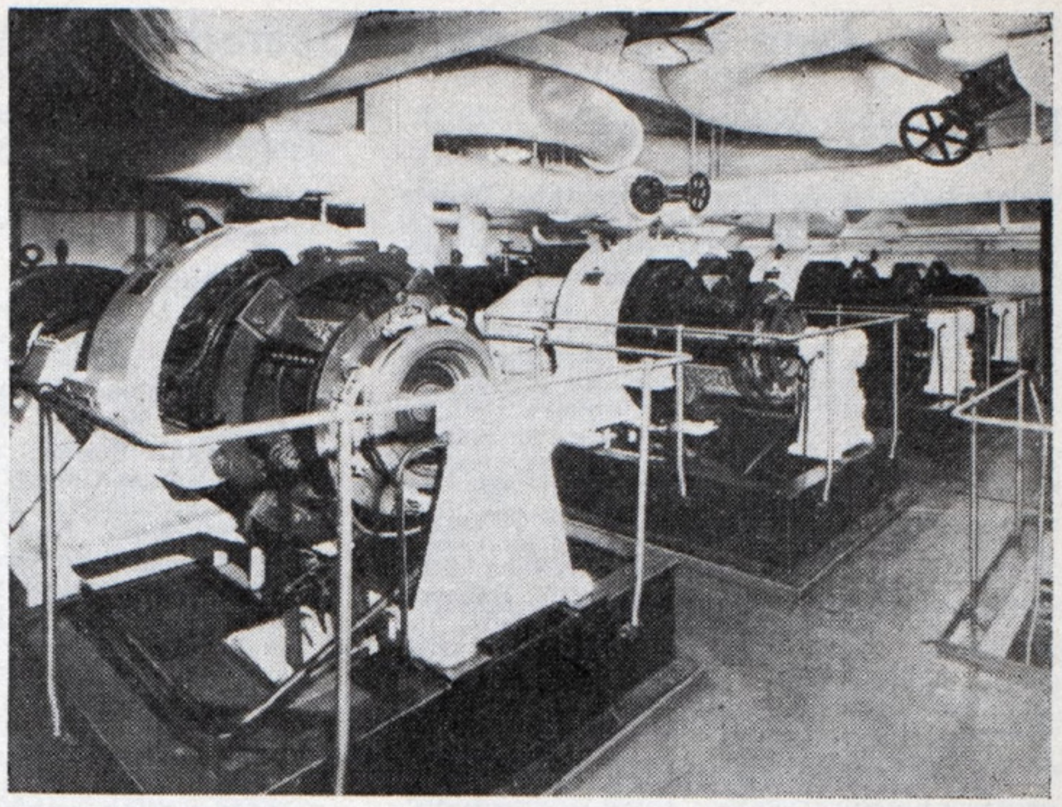
Service For Passengers

The main galley on the MARIPOSA was laid out in accordance with the experience of the owner to give ample and efficient dining service to all passengers. It is located on E deck, between the main dining saloon and the cabin dining saloon and serves both. The arrangement of the galley is influenced by the fact that the boiler trunk divides the forward end facilitates a circular flow of waiters' traffic. The eight Westinghouse electric range sections are placed together to form one big range, with a hood above, in the central part of the galley. Arranged conveniently are numerous electrical and steam cooking devices and modern galley equipment.

In addition to the galley equipment noted above, deck pantries are fitted on A, B, C, and D decks to serve beverages, ices, and the like

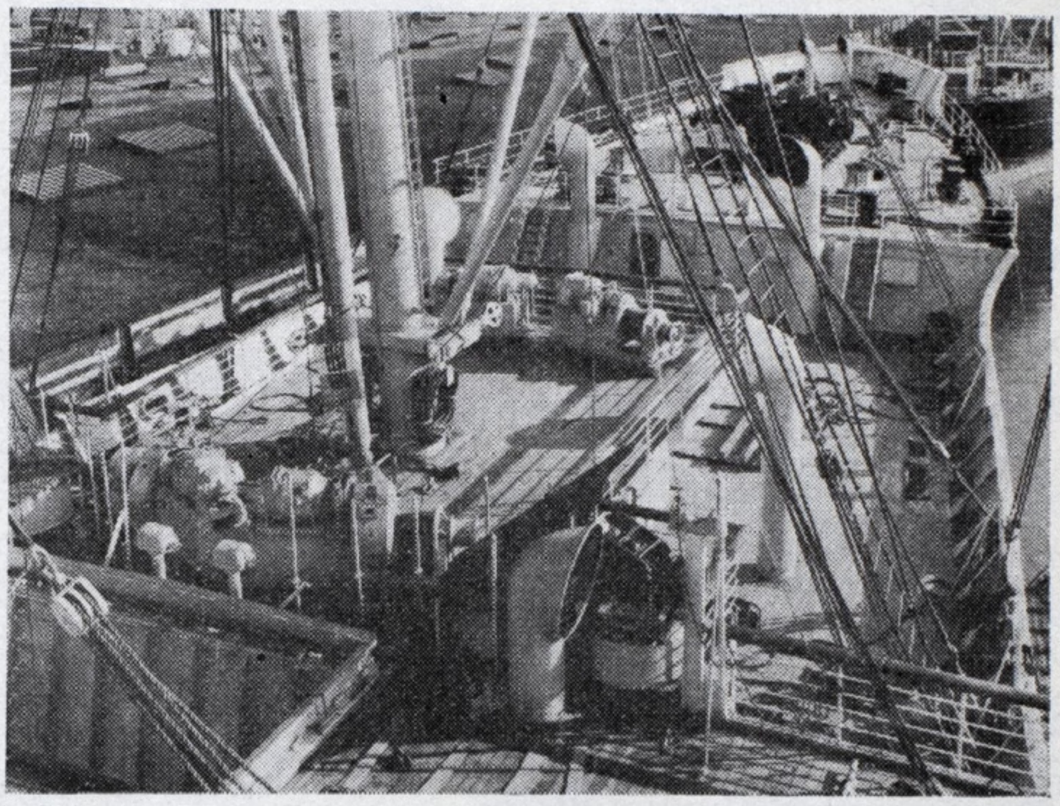


Above, Compressors for Refrigeration



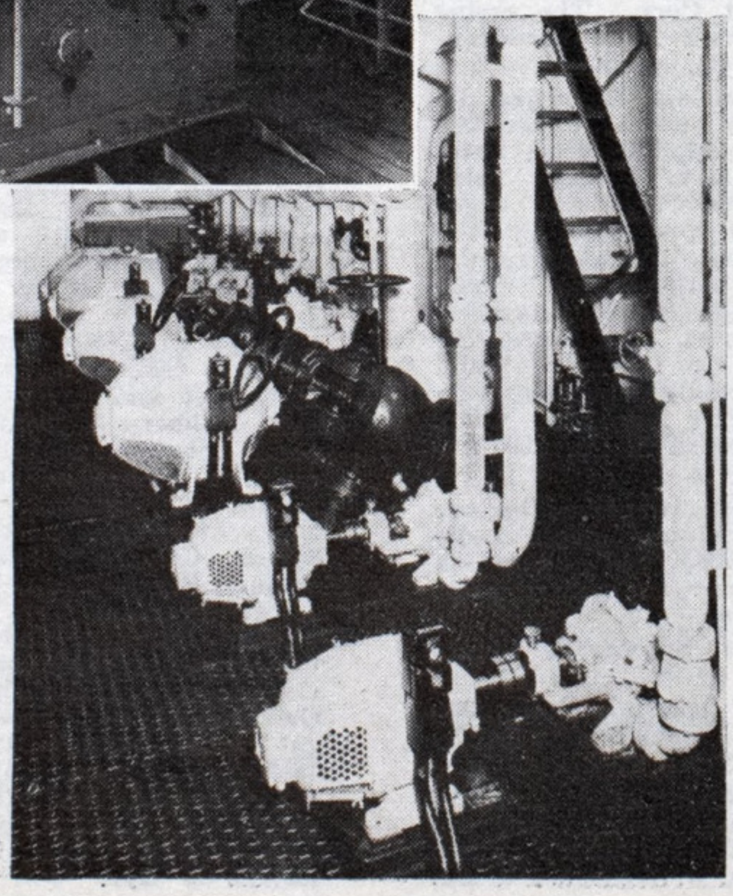
Above, Four Turbine Generators

S. S. Mariposa Machinery Installations



Above, Forward Deck View

Above, Davits and Lifeboats



Right, Pumps and Controls

Above, Main Galley, Electric

Twin Screw Turbine Geared Liner Mariposa—Auxiliaries and Equipment

Boilers and Auxiliaries

Twelve Babcock & Wilcox watertube Boilers in two Firerooms—Total heating surface, 53,520 square feet; total superheating surface, 4760 square feet; total air heating surface, 32,112 square feet. The boilers are built to American Bureau of Shipping and United States steamboat inspection service rules and regulations, for a working pressure of 400 pounds per square inch at boiler drums. Steam pressure at superheater outlet is 375 pounds per square inch at a temperature of about 650 degrees Fahr. Babcock & Wilcox desuperheaters are fitted in four of the twelve boilers to furnish steam for auxiliary purposes. Furnaces are lined with Babcock & Wilcox No. 80 firebrick, and special insulation. Each boiler is equipped with four, double front Babcock & Wilcox mechanical atomizing oil burners of the Cuyama type operating under forced draft with closed firerooms.

Each boiler is mechanically cleaned during each operation by a single installation of Diamond Power Specialty Corp.'s automatic valve-in-head type soot blowers. This installation serves both boilers and superheaters and in addition there is a double installation of plain units serving each air heater.

Smoke Indicators—Wages.

Air Ejectors—Four, Westinghouse.

Forced Draft Blowers—Eight, vertical, motor drive, B. F. Sturtevant & Co.

Feed Water Heaters—One 4-tier improved paracoil (first stage) lifting shell type; coils arranged two-pass; one 4-tier improved paracoil (second stage) lifting shell type; coils arranged two-pass. Davis Engineering Corp.

Evaporators—Two paracoil steel shell with automatic float feed control. Davis Engineering Corp.

Distillers—Two paracoil galvanized steel shell. Davis Engineering Corp.

Charcoal Filter—One 2½-inch paracoil, aerating type for filtering drinking water. Davis Engineering Corp.

Fuel Oil Heaters—Four vertical coil type, Bethlehem-Dahl.

Fresh Water Heater—One vertical controlled by thermostat valve. Alco Products Co.

Liquidometers—Two. Liquidometer Corp.

CO_2 Recorders—Two, Ranarex type. Permutit

Engine Room Auxiliaries

Turbine Generators—Four 500 k.w., 240/120 volt, Westinghouse Electric & Mfg. Co.

Electric Motors—Fifty-four drip proof or semi-enclosed motors for under-deck auxiliaries ranging in horsepower from 1½ at 1750 r.p.m. to 75 h. p. at 900/450 r.p.m., each complete with magnetic controls. Westinghouse Electric & Mfg. Co. These motors are for: Auxiliary condenser circulating pumps, main condensate pumps, auxiliary condensate pumps, bilge and ballast pumps, emergency bilge pumps, fire and sanitary pumps, CO_2 condenser circulating pumps, cargo brine refrigeration pumps, ship's stores brine refrigeration pumps, fresh water pumps, drinking water pumps, hot and ice water pumps, fuel oil transfer pumps, forced draft blowers, lubricating oil pumps, fuel oil service pumps, air compressor, refrigeration CO_2 compressors, shaft turning gear.

Air Compressors—Two vertical duplex 2-cylinder single acting. Worthington.

Centrifuges—Two Sharples Specialty Co. Inc. turbine oil super centrifuges in No. 6 frames, driven by 3 h. p. Westinghouse d. c. motors at 3450 r. p. m.

Electric Storage Batteries—Emergency lighting, watertight doors, wireless telegraph, bilge pumps, 60-cell 21 plate Exide marine emergency battery. Three sets of 11-cell Exide marine batteries for interior communication, fire alarm, and enunciator bells. One 6-cell Exide ironclad marine battery for radio transmitting and receiving set and lights for each of two motor lifeboats. The Electric Storage Battery Co.

Emergency Generating Set—One 30 kilowatts, 125 volt, 600 r. p.m. Westinghouse generator with control panel and one set of spare parts. Driven by an Atlas Imperial diesel.

Lubricating Oil Coolers—Four, of vertical type. Bethlehem.

Exhauster—One gland leak-off vertical type. Sturtevant.

Condenser—Two straight tube type, Bethlehem.

Pump Regulators—Swartwout.

Pressure Regulators—Leslie Co.

Pyrometers, etc.—Brown Instrument Co.

Pneumercators—Pneumercator Co.

Pumps and Services

Reciprocating Pumps, Steam Driven—Two 12 x 8 x 18 inches auxiliary feed; two 8 x 10 x 24 inches fire and bilge; two 5½ x 3½ x 12 inches fuel oil service; two 4½ x 2¾ x 6 inches boiler test, all vertical single acting. Warren Steam Pump Co. Inc.

Centrifugal Pumps, Steam Driven—Two 18-inch single stage vertical Warren-Moody main circulating; two 5-inch, 3-stage horizontal main feed. Warren pumps close coupled to Sturtevant turbines. One port feed pump, horizontal single stage, De Laval.

Centrifugal Pumps, Motor Driven—Two 10-inch single stage, auxiliary condenser circulating; two 5-inch single stage bilge and ballast; two 4-inch 2-stage, fire and sanitary; two 4-inch, single stage, CO_2 condenser circulating; three 2-inch, single stage, cargo brine; one 1½-inch, single stage, ship's stores brine; three 2-inch, single stage, fresh water; two 1½-inch, single stage, drinking water; four 1½-inch, single stage, hot and ice water; all of these horizontal. Four 3½-inch x 2-inch single stage, combined main condensate and turbine drain; three 2-inch, single stage auxiliary condensate; one 4-inch, single stage, emergency bilge; all horizontal. All Warren pumps driven by Westinghouse motors. Two 1½-inch Goulds pumps for handling condensate. Two Hytor priming pumps and one small circulating pump by Nash.

Rotary Pumps—One lubricating oil purifier pump, 6 gallons p. m. against 20-foot head with 3-foot suction lift. Northern Pump Co. pump driven by Westinghouse motors at 850 r. p. m. Four lubricating oil, two fuel oil transfer, four fuel oil service, all screw type motor driven Quimby pumps.

Ventilation and Refrigeration

Air Conditioning—Complete Carrier system of air conditioning installed by the Brunswick-Kroeschell division of the Carrier Corp.

Refrigeration—System of CO_2 refrigeration for cargo and ship's stores. Brunswick-Kroeschell.

Ventilation—Ventilating sets, ranging in horsepower from 1/12 h. p. at 125 r. p. m. to 21 h. p. at 470/610 r. p. m. have been installed to the number of 77. The fans were supplied by B. F. Sturtevant Co. and the electric motors driving them by Westinghouse Electric & Mfg. Co.

Safety Equipment

Life Saving—Two 26-foot motor lifeboats, 10 persons capacity each boat; 14 thirty-foot metallic lifeboats, 70 persons capacity each; 4 twenty-six foot metallic lifeboats, 40 persons each; 2 twenty-foot wooden lifeboats, 18 persons each. Welin-MacLachlan gravity davits with electric hoisting gear serve all of these boats except the two 20-foot boats which are served by Welin quadrant davits. All lifeboats and davits supplied by Welin Davit & Boat Corp. The motor lifeboats are equipped with 16 h. p. Standard Motor Construction Co. engines.

Fire Detection and Prevention—Rich fire detecting system in cargo spaces, storerooms and other parts of the ship; a Salex automatic electric fire alarm system with thermostats in every stateroom and every other compartment not protected by the Rich system; Lux carbon dioxide fire extinguishing system in boiler rooms, cargo holds, oil filling stations, paint lockers, lamp room and storerooms. All three systems by Walter Kidde & Co. Sixty-two hand fire extinguishers of 2½-gallon capacity furnished by the Buffalo Fire Appliance Corp. Pyrene extinguishers located in unerated automobile spaces.

Radio—All radio equipment furnished by the Radiomarine Corp., including ship's radio and motor lifeboats; also radio direction finder and R. C. A. Victor centralized radio for broadcast programs.

Depth Finder—Fathometer, Submarine Signal Corp.

Anchor Chain—Cast steel studlink chain, 330 fathoms, 3⅛-inch wire diameter supplied by National Malleable & Steel Castings Co.

Signalling—Electrically operated telegraphs for engine order, docking, steering and fire room signal service; also call bell system with enunciators. Chas. J. Henschel & Co.

Submarine Signals—Submarine Signal Corp.

Compasses, etc.—Two navy type magnetic compasses and binnacles, Walker-Trident electric log, chronometers barograph and other navigating material supplied by Kelvin & Wilfrid O. White Co. Pitometer log, Kearfott Engineering Co.

Gyro Compass etc.—Gyro compass with course recorder and repeaters; gyro pilot; two pilothouse type incandescent searchlights; self-synchronous rudder indicator; engine speed indicator with comparator. Sperry Gyroscope Co. Inc.

Counters, etc.—Two-shaft telltale averaging counter; internal type Gary-Cummings torsion meter. Cummings Machine Works.

Miscellaneous Equipment

Windows—Glass enclosed first class promenade deck, fitted with windows of sliding type with metal frames 36 x 30 inches, mechanically operated. Kearfott Engineering Co. Inc.

Steering Gear—Electro-hydraulic steerer with dual prime movers and hydraulic telemotor control, driven by two 75 h. p. Westinghouse motors; the pumps, size 50 units supplied by Waterbury Tool Co. Telemotor, McLeod & Sons. The complete steering gear, American Engineering Co.

Windlass—Horizontal spur geared dual motor drive, two wildcats, two gypsies; the motors are two 50 h. p. Westinghouse. The windlass by Bethlehem Shipbuilding Corp.

Capstans—Four self-contained, driven by 75 h. p. Westinghouse motors. American Engineering Co.

Winches—Eight single geared, high speed; two double reduction heavy duty; all Westinghouse 35 h. p. motor drive. Allan Cunningham.

Boat Winch Equipment—Six fitted with 13½ h. p. and two with 20 h. p. Westinghouse motors. Welin Davit & Boat Corp.

Deck Covering—Selbalith deck covering laid in crew's quarters, passage ways and other service spaces. Smooth, non-slip, sanitary, fireproof and vermin-proof flooring, easily cleaned, has considerable resiliency. Selby, Battersby & Co.

Rubber Tiling—Extensively used throughout the ship in passenger quarters and public spaces; shades of coloring to suit interior decoration. United States Rubber Co.

Laundry Machinery—Complete line of laundry machinery, consisting of nine units all motor driven; also other miscellaneous equipment. American Laundry Machinery Co. Laundry conveyors. Lamson Co.

Galley Equipment—Ten electric ranges; two bake ovens. Westinghouse Electric & Mfg. Co. Pantry and galley equipment, mainly of monel metal, a silvery nickel copper alloy, produced by the International Nickel Co. Galleys equipped with aluminum range utensils and steam jacketed kettles. The Aluminum Cooking Utensil Co.

Bracket Fans—Seventy-seven 12-inch marine type oscillating fans; 130 twelve-inch marine type non-oscillating fans. Westinghouse Electric & Mfg. Co.

Plumbing Fixtures—One hundred thirty two bathtubs; 386 lavatories; 307 bowls; 18 urinals; all for passenger quarters; 82 lavatories; 6 sinks; 8 urinal troughs; 43 closets. All of these and fittings for these fixtures, including bath fittings, showers, closet seats, valves, lavatory fittings, etc., supplied by Standard Sanitary Mfg. Co.

Pipe—Fire main; smoke detecting; CO_2 extinguishing system; heating coils in fuel oil deep tanks and inner bottom ballast tanks; plumbing lines and deck drain; service drains; ice water lines in engine and boiler rooms; piping in engine casing; fresh and salt water lines on boat and B, D, E, and F decks; couplings. A total tonnage of 163.7 tons of genuine puddled wrought iron pipe, both black and galvanized, butt and lap weld. Reading Iron Co.

Plastic Rubber—A product forming permanent bond between rubber and metal used to make a gasket or seal by the Submarine Signal Co. between the submarine signal tanks and inside of the hull in the bow of vessel. Colvulc Rubber Co.

Machine Shop Tools—Completely equipped. J. T. Ryerson.

Lighting Fixtures—Decorative fixtures supplied by Black & Boyd; X-ray reflector by Curtis; general lighting fixtures throughout the ship, Lovell-Dressel Co. Inc.

Sign Lights—Polarite type. Frink Co.

Telephones—For passengers, 400 line, one position board, Western Electric Co. For ship's use, Chas. J. Henschel & Co. Inc.

Clocks—Electric clocks in all public spaces by Landis & Gyr.

in staterooms and public spaces. A pantry on the boat deck is arranged to serve meals in the officers' mess, the food being sent up from the main galley on a dumbwaiter. There is a crew's galley forward, completely equipped for serving food to the crew.

The laundry is located on F deck amidships, and contains the latest machinery for completely equipping a modern ship's laundry, all of which was obtained from The American Laundry Machinery Co. The machinery is electric, and is capable of washing, drying, and ironing the entire daily supply of ship's linen, and of taking care of passengers' laundry also.

A printing shop is to be found on F deck forward, with presses and linotype machine, for printing the ship's menus and newspaper.

A tailor shop is also provided for mending and pressing clothes.

There is a fully equipped hospital, divided into operating room, men's ward and women's ward, each with two beds, and also a crew's hospital.

A doctor's office is located aft, having entrances from both first and cabin-class accommodations. A waiting room is provided, and the doctor's stateroom adjoins.

Refrigerators in the galley, deck pantries, and first-class soda fountain and bar are connected to the ship's refrigerating system. Those in the crew's galley and in the cabin bar are individual units, and were supplied by the Brunswick-Kroeschell Co.

The plumbing systems include hot and cold fresh water, a cold salt water sanitary system, and a circulating ice water system.

Cold fresh water is stored in tanks in the double bottom and hold, and is pumped into the main system, which is kept constantly under pressure. Fresh water heaters in the engine room, operating at 140 degrees Fahr. provided a supply of hot water at all times anywhere in a moment.

The sanitary system is supplied with cold salt water, and is limited to flushing toilets, slop sinks, and the like. No salt water is supplied to passengers or crew for personal bathing purposes. No connection is made between salt and fresh water systems.

The ice water circulating system maintains a supply of cold water to drinking fountains and drinking water supply taps in all parts of the ship.

Every first class room has a private toilet and the majority of first class rooms have a private bath or shower, or a bath for the use of either of two adjoining rooms. First class rooms on D deck are so arranged that a bath is convenient to each group of four rooms, being located at the end of, and entered from, the short passageway that serves those rooms.

Cabin class rooms are well supplied with toilet facilities; though private baths are not fitted, public lavatories and baths are ample in number and size, and are extremely well appointed.

In plumbing, sanitary systems, and fresh and drinking water supplies, the MARIPOSA equals the best new hotels. Plumbing fixtures throughout the ship were made by the Standard Sanitary Mfg. Co., the single exception being that Sloan flush valves are used.

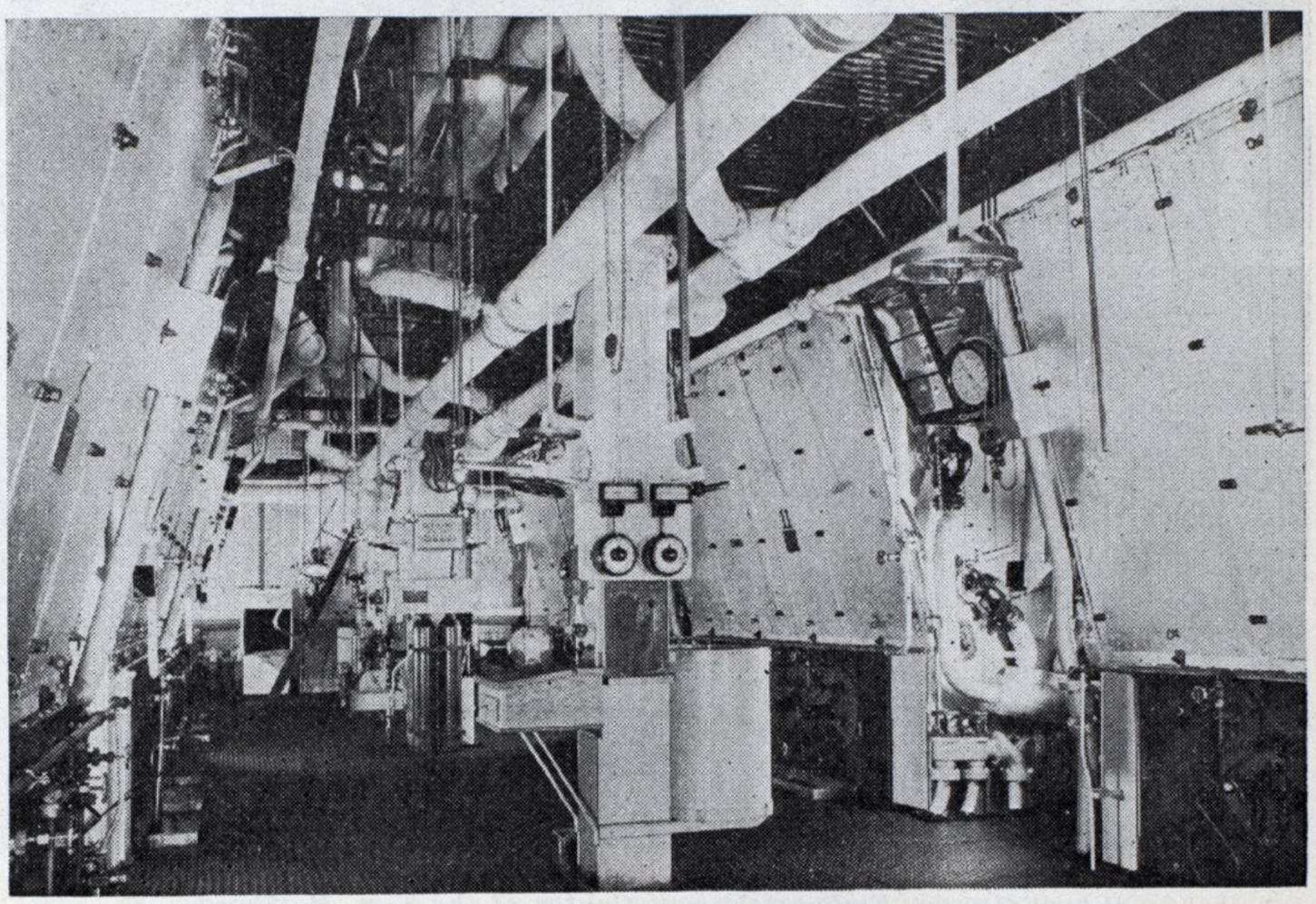
A new type of faucet is used on the MARIPOSA which is self-closing but which can be regulated to close very slowly, thus having the convenience of a steady running faucet while preventing waste by being left open accidentally or for long periods.

Staterooms are large and complete in appointments; every detail has been arranged to serve the comfort and convenience of the passenger. Fittings and decorations of both first and cabin class rooms are practically identical. The MARIPOSA can therefore be used as a one class ship simply by leaving open the doors, ordinarily closed between classes.

Beds in all first and cabin class rooms, are made of steel in imitation of bamboo. Each stateroom has a bureau with large drawer and sliding shelf space. Large wardrobes are fitted in every room. Light strong wicker chairs are used. Running hot and cold fresh water is provided in every room, and ice water is contained in large thermos pitchers. Every room in both classes also has a telephone. On the side of each bureau is a convenience outlet on the 115 volt system for electrical appliances, such as curling irons and fans.

The first-class rooms have beds only—no upper berths—and are arranged for one and two persons. There are 67 single rooms, and 209 double rooms. Double rooms are mostly equipped with twin beds, though there are double beds in several. Many of these rooms are arranged to be used as suites, doors between adjacent rooms being provided.

Cabin-class rooms have been arranged for two, three, and four persons; 3 for two persons, 33 for three persons, and 31 for four persons. Beds are provided in all of these rooms, and one or two upper berths as required. These upper berths were especially designed for the MARIPOSA and her sister ships. They are of the folding type, with a double hinged ararngement which permits each to fold up into a shallow built-in box high up in the room, leaving almost full headroom over the beds. The rooms thus appear to be without berths. Beds and berths, supplied through Hopeman Brothers, are of Simmons manufacture.



One of the Two Boiler Rooms on the S. S. Mariposa

Two passenger elevators are provided, one running from the boat deck to E deck inclusive, the other from A deck to F deck inclusive. An engineers' elevator is also installed, running from the boat deck to F deck inclusive, in way of the engineers' quarters; a crew's or ship's stores elevator, from A to F decks; and two baggage elevators, between E and F decks only. The dumbwaiter between officers' mess and galley is also electrically operated. All were supplied by the Otis Elevator Co.

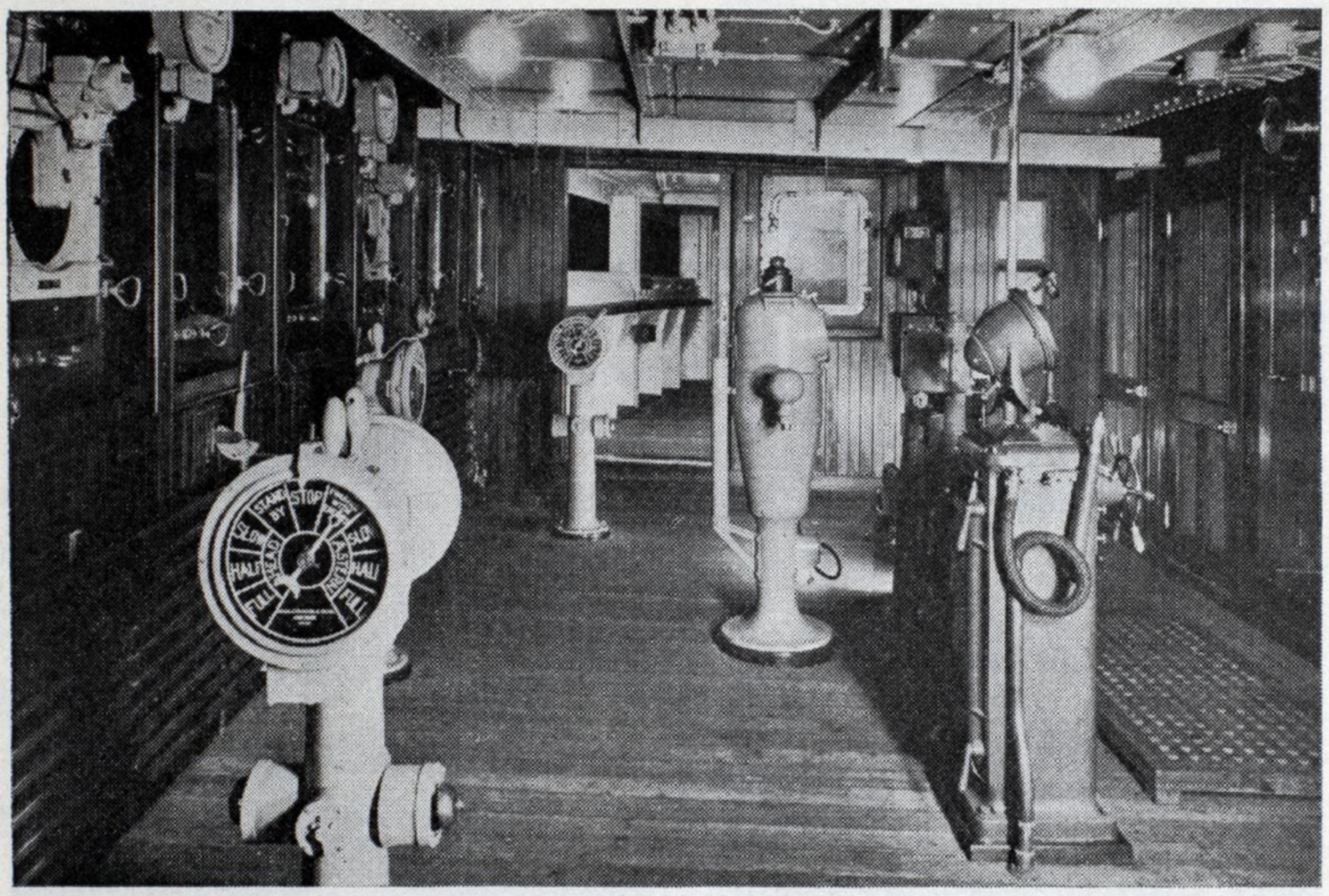
A fully equipped barber shop is provided for the use of first-class passengers; and a ladies' beauty parlor of equal quality. In the cabin-class an additional barber shop and another beauty parlor are provided

for the sole use of cabin passengers.

On D deck in the forward foyer is an attractive novelty shop, which now seems to be a necessary feature of a modern passenger ship.

The central telephone control is located on E deck, off the forward foyer. Adjacent is the chief steward's office, the purser's office for first-class passengers, and the freight clerk's office. The cabin purser's office is aft, on D deck.

A broadcasting system is installed which distributes entertainments or lectures given on shipboard as well as radio programs from shore. Microphones can be installed in the main lounge and dance pavilion and at the captain's table in the main dining saloon; loud speakers are installed in all public spaces, on deck, and in private verandas and parlors and suites for use when desired.



Wheel House—Elaborate Nerve Center of the S. S. Mariposa

Two duplex talking picture systems have been provided for the entertainment of the passengers. One is installed in the main lounge; the other in the cabin lounge.

Deck covering throughout all passenger space, in public rooms, staterooms, and corridors, and on stairways, is rubber tile, all supplied by the United States Rubber Co. Carpets and rugs are used in staterooms, foyers, public rooms, and elsewhere.

A gymnasium for passengers is provided on the boat deck. It is completely equipped including weights, rowing machines, medicine balls, boxing gloves, punching bags, a mechanical horse, and other apparatus.

The number of staterooms on board the MARIPOSA is as follows: 266 first-class rooms accommodating 475 passengers; 67 cabin-class rooms, accommodating 229 passengers. The seating capacity of the main dining saloon is 376 persons; and of the cabin dining saloon, 134 persons.

Machinery Installation

MACHINERY of the MARIPOSA consists of high pressure, high temperature watertube boilers, single reduction geared turbines and electric auxiliaries. A twin-screw installation, designed for 22,000 total shaft horsepower at 124 revolutions per minute of propellers in normal operation.

In the boiler plant are twelve units in two fire rooms, arranged for forced draft with closed stoke hold. The boilers are of Babcock & Wilcox cross-drum marine type, fitted with inter-deck superheaters, tubular air heaters, soot blowers, food regulators, and smoke indicators. Each boiler has four Cuyama oil burners. Total water heating surface is 53,520 square feet; total superheating surface is 5352 square feet; and total air heating surface is 32,112 square feet. The four centerline boilers are fitted with desuperheaters in the steam drum having a total surface of 180 square feet. The designed steam conditions at the superheated outlet are 375 pounds (gage) and 650 degrees Fahr. total temperature.

Air for combustion is provided by eight motor-driven fans, four in each fire room, of which two are spare. These fans draw the air through suction ducts leading from the exposed deck and discharge it into the fire room. The air in the fire room enters the air heaters at the front of the boiler and passes through air casing and around and under the boiler, and through a double front, to the oil burners. There are two double stacks, each serving six boilers.

In each fire room there are two fuel oil service pumps, one of which is spare, a fuel oil transfer pump, and an emergency fuel oil service pump, and two fuel oil heaters, one of which is spare. There is also a complete installation of fuel oil strainers, fuel oil meters, CO_2 indicators, gas and air temperature thermometers, and gages, etc.

The propellers are of solid manganese bronze,18 feet 0 inches in diameter and 19 feet 6 inches pitch, each having three blades; the blade sections are of streamline shape. The developed area is 105.8 square feet; the projected area, 88.7 square feet.

Main Propelling Turbines

Each set of turbines consists of three units of Bethlehem-Parsons turbines in series, arranged in separate casings around a single gear wheel. The high pressure unit is an impluse-reaction turbine with dummy piston just forward of the impulse wheel. The intermediate pressure unit is a straight reaction with dummy piston at the aft end. The low pressure unit is a double-flow straight reaction turbine. The astern unit, located in the forward end of the low pressure casing consists of two impulse stages, with three rows of rotor buckets in the first stage and two rows of rotor buckets in the second stage. All ahead turbines have rotors of drum construction.

The steam conditions at the turbine throttle valve are 360 pounds (gage) and 650 degrees Fahr. total temperature. The vacuum at the low pressure turbine exhaust flange is 28.5 inches.

There are 29 nozzles in the lower half of the high pressure chest, 15 of which are under control of the turbine throttle valve and the remainder in three groups of 2, 4, and 8 nozzles, respectively, controlled by hand valves.

Overspeed governors are provided which function as follows: An impeller on the forward end of the high pressure turbine shaft discharges lubricating oil to an adjustable spring-loaded valve which serves to actuate a pilot valve, which in turn controls the flow of oil (under lubricating oil pump discharge pressure) to and from an operating cylinder closing the main ahead throttle valve.

The single reduction gearing is of the double helical type, manufactured by the Falk Corp, and the main proportions are as follows: Pitch diameter, gear wheel, 156 inches; pitch diameter, pinions, 12.25 inches; net face, 56 inches.

The propeller thrust is taken by a 34-inch nominal diameter double horizontal, self-aligning, equalizing, six-shoe Kingsbury thrust bearing, incorporated in the forward end of the gear casing. Three-shoe bearings of the same type, with a nominal diameter of 13½ inches are fitted on the forward end of each turbine shaft.

Located outboard of the low pressure turbines and connected thereto by double exhaust trunks are two

Bethlehem main condensers of the single pass type, each with a cooling surface of 13,562 square feet. These condensers are served by injection scoops. For maneuvering and standby conditions, vertical turbine-driven propeller type circulating pumps are provided, one for each main condenser.

Each condenser is provided with a twin-stage air ejector mounted on a combined inter-and after-condenser. Each two-stage unit has sufficient capacity to remove the air from condenser it serves when the unit is developing maximum power. The other set is used as a standby.

Two vertical motor-driven centrifugal main condensate pumps are provided for each unit, one being a standby pump. On the end of the condensate pump shaft and contained in the same casing there is provided a turbine drain pump.

There are four Westinghouse 500 kilowatt, 240/120-volt direct current geared turbo-generators, 6000-1200 revolutions per minute with external balance coils; each generator is capable of 25 per cent overload. The turbines are of the high-speed, high-efficiency type. The turbines of the two inner generators are arranged for emergency atmospheric exhaust.

There are two 3400 square feet Bethlehem two-pass straight tube condensers serving the four turbo-generators. One 10-inch horizontal single stage centrifugal circulating pump is provided for each condenser. There is a twin two-stage air ejector mounted on a combined inter-and after-condenser for each condenser. One two-stage unit is sufficiently large to remove the air from the condenser it serves at maximum power, the other being a standby.

All air ejector inter-and after-condensers are cooled by condensate only. A recirculating connection is provided from the discharge side of the air ejector condenser to the condenser unit it serves to provide sufficient cooling water under emergency conditions.

All auxiliary turbines take steam at full boiler pressure and full temperature, and exhaust against a back pressure of 10 pounds, with the exception of the turbo-generators which exhaust into a condenser at 28.5 inches vacuum.

The emergency steam-driven reciprocating pumps take steam at full pressure, which has passed through the desuperheaters in the four centerline boilers.

All motor-driven auxiliaries are equipped with Westinghouse motors and control equipment.

The evaporating plant consists of two evaporators with automatic feed regulators, two distillers and the necessary interconnecting piping. It is normally used for pre-evaporating raw fresh water for makeup feed pump supply. Under these conditions operating steam is taken from the high pressure bleeder line and the made vapor is discharged to the low pressure bleeder line.

Connections are provided to permit making fresh water from salt water. Under these conditions the vapor is condensed in the distillers and the water is then discharged to the various fresh water tanks.

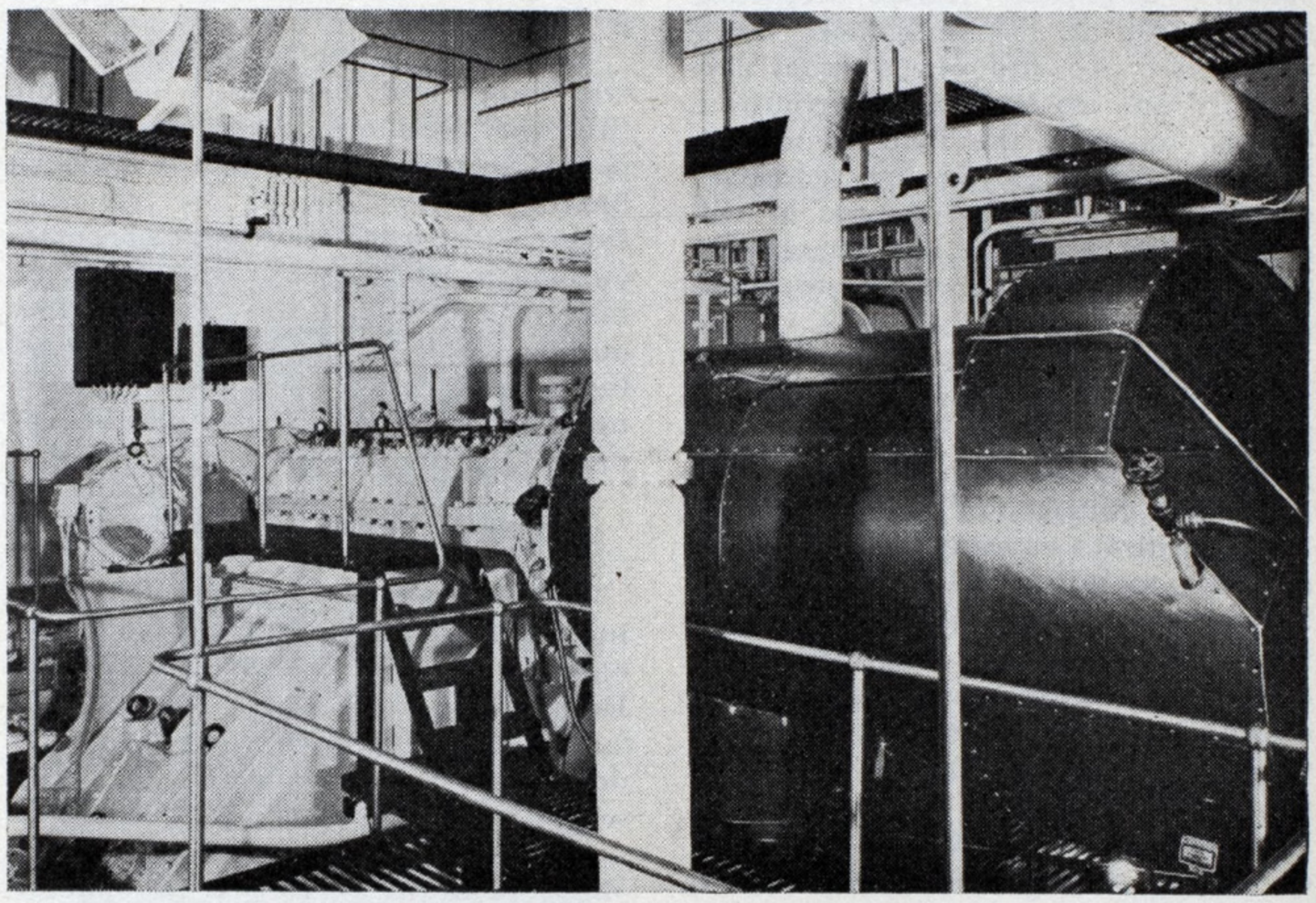
Provision is made for taking operating steam from a reduced pressure steam line, instead of from the high pressure bleeder, for port and emergency operation.

The cycle used provides pre-evaporated makeup feed or evaporated fresh water at a minimum cost in fuel.

A hand-controlled orifice connection is provided that will recirculate feed through the dynamo condensers under emergency operating conditions, in order to prevent steaming in the feed tank.

A McNab salinity indicating system is installed, test lines being fitted at various points where salt water pollution may take place.

One "Short" alarm service tank is located in each fire room which separates oil out of polluted steam drains from fuel oil heaters and fuel oil tank heating coils. An electric alarm bell system notifies the operator when oil has collected in the "Short" tank.



Main Engines S. S. Mariposa. Port Intermediate Pressure Turbine. Top of Reduction Gears and Turning Motor

Refrigeration and Air Conditioning

There is a Brunswick-Kroeschell refrigerating plant for cooling cargo and ship's stores and for conditioning the air in the dining saloon. The refrigeration is divded into three separate systems, which permit cooling the cargo with either high or low temperature brine, as follows:

First, low temperature brine system to operate on the following under all conditions: Pantry boxes, located on main and upper decks; ice cream freezer, located on B deck; ice-making set, located on F deck; scuttle-butt, located in brine return tank room; and ship's stores, located on E and F decks.

Second, low temperature brine system to operate on any or all main cargo spaces on F and G decks when these boxes are loaded with cargo requiring temperatures at or below freezing.

Third, high temperature brine system to operate on any or all main cargo spaces on F and G decks when those boxes are loaded with cargo requiring temperatures above freezing.

The compartments mentioned in the second and third systems above are also equipped with air coolers, ducts, fans, and dampers.

The compressors, evaporators, and pumps are so interconnected as to permit great flexibility of operation. The two-temperature brine system permits operating at high and low back-pressures simultaneously, thereby greatly increasing the efficiency of the plant and reducing the horsepower consumption per ton of refrigeration.

In order to keep a close check on the temperature of the various cold storage compartments there is provided a system of Brown distant reading electric thermometers with an indicator in the brine distribution room.

The air-conditioning system is a direct expansion system operating on an air conditioner located on F deck for cooling and conditioning air for the main cabin dining saloon. This system utilizes one compressor and one condenser of the cargo refriger-

ating plant for the air conditioning.

There are also two Brunswick-Kroeschell refrigerating units installed in the crew's galley and cabin class bar.

Electrical Hook-up and Load

The main switchboard consists of 10 panels and is about 22 feet long. The power bus is 230-volts and the lighting bus 230/115 volts with a grounded neutral. All circuit breakers providing power to auxiliaries have the time-delay feature, and breakers supplying the galleys have under-voltage trips.

There are a total of 46 electric stations throughout the vessel for the distribution of power and lighting. Some are for power, some are for lighting, and some are for both. Power feeders for these stations are run direct from the main switchboard. Duplicate 3-wire lighting feeders, for all but machinery compartments, are run direct from the forward and aft lighting distribution boards, one-half the load connected to each. The lighting for the various machinery compartments is fed direct from the main switchboard to individual panels in each compartment.

The total connected power load is 2600 kilowatts and the total lighting load is 230 kilowatts.

The emergency power and lighting plant consists of a 30-kilowatt, 115-volt direct current diesel engine-driven generating set and a 60-cell 310-ampere hour storage battery. If the main generating plant fails, the emergency lights are automatically switched over to the storage battery, which has power available to supply the radio equipment and emergency lights for a period of about 2 hours or until the emergency generator is on the line.

The supply for the various 115-volt interior communication system is from the emergency bus; for ship's telephone system and miscellaneous interior communication system, from three 115-ampere hour storage batteries. The passengers' telephone system has its own storage batteries and charging motor generator.

Lighting for Passenger Quarters

The lighting installation for the passengers' quarters was worked out in conjunction with the interior decorators. All of the decorative fixtures were manufactured from special designs made by the architects to suit the various decorative schemes. Reflectors of X-ray type were used for all indirect lighting. There are 4250 lighting fixtures containing a total of 6600 lamps, varying in size from 10 watts to 1000 watts.

Of special interest is the decorative lighting scheme for the dance pavilion. All lighting is controlled from the musicians' platform, and in addition to the regular lighting there are four spot lights with motor-driven revolving color lenses which illuminate a revolving crystal, creating a novel effect comparable with the most modern night club.

Fourteen 100-watt flood lights have been provided for illuminating the side of the ship when launching lifeboats. These lights, together with all outside lighting on the top side and such other lighting as may interfere with the navigation of the ship, are controlled from the lighting distribution panel in the wheel house.

One hundred and ninety 12-inch bracket fans are provided for public spaces, crew's quarters and various offices.

All motors are designed for 110 per cent continuous rating in order to operate satisfactorily in the tropics. There is a total of 235 motors ranging in size from ¼-horsepower to 75 horsepower, the aggregate of which is 2500 horsepower.

Wherever possible open-type control equipment has been used and this has been assembled on special panels to form group control switchboards at the various electric stations. All control equipment is semi-automatic with remote control push-buttons at the motors. On all vital auxiliaries in the machinery spaces indicator lights have been provided over the gage boards to show the operation of the auxiliary.

Controls for Watertight Doors

There are twenty watertight- sliding doors below the bulkhead deck, electrically operated by the Cutler-Hammer system which consists of motors and control equipment at each door and master controls in the wheel house. Provision is made to open or close these doors either singly or all at once from the master control. Mechanical control is also provided at each door from stations above the bulkhead deck. An electrical indicating system shows the position of each door, at each mechanical control station. Safety gates which close before the main door operates are provided in all passages through which passengers may pass.

Two separate systems of collision and alarm bells are provided, one for officers and crew and the other for passengers' quarters.

There are two Henschel telephone systems, one for use in navigating the ship with telephones located in the wheel house, engine room, steering engine room, crow's nest, forecastle deck, and aft docking station, the other for the use of the engineering force, with telephones located in the engine room, chief engineer's stateroom, chief engineer's office and each fire room.

There is also provided a complete telephone system for the use of the passengers and ship's personnel. This is a standard American Telephone & Telegraph installation, consisting of a 400 line, 1 position switchboard and telephones in each passengers' and officers' stateroom. The telephone in passengers' staterooms are the French or cradle type. All office, operating stations, and all electric stations are also connected to this switchboard. Shore connections are provided to enable calls to be put through the local exchange while the ship is docked.

A system of call bells is provided for the convenience of passengers on the promenade deck, in all public spaces, and public baths and toilets, with annunciators in the various deck pantries. Call bells are also installed in each cold storage compartment with an annunciator in the steward's stores.

Miscellaneous signal and alarm devices for the use of the engineering forces are provided as follows: Fuel oil filling signals with bulbs and pushbuttons at all filling manifolds and transfer pumps; lubricating oil low level alarm; feed tank low level alarm; and various voice tubes for communication.

Interior Decoration

INTERIOR decoration is by Warren and Wetmore, architects, of New York city. Joiner work was done by Hopeman Brothers, Rochester, N. Y., who worked in conjunction with the architects to produce furnishings of a style appropriate to the service in which the MARIPOSA is to be used. With service in the tropics in mind, the decorators selected soft cool colors for the interiors; using oriental and Chinese Chippendale effects.

The keynote of design is simplicity; and beauty is obtained without ornate and elaborate decorations. Heaviness of style has been avoided. Furniture throughout the ship is light in appearance, and therefore cool in effect. Rattan and cane is much used, finished both naturally and in vivid contrasting colors. Heavy appearing hardwood is eliminated from first class quarters, and is used only in the curly mahogany bar counter in the men's club room. Drapes and curtains are entirely omitted in the first class; carved wood grilles in soft tones are substituted for them at windows in public rooms. The MARIPOSA is, in fact, the first passenger ship afloat which has not a single curtain or drapery in any first-class stateroom or public room, excepting the rather necessary stage curtain in the main lounge. The effect of this omission is an appropriate and pleasant departure from the ordinary.

The general color scheme used is soft, pale tints of gray, green, and blue.

Corridors, foyers, and stairways are free from heavy moldings and

(*Continued on Page* 54)

Captain Charles A. McAllister 1867—1932

CAPT. CHARLES A. McALLISTER, president of the American Bureau of Shipping and one of the outstanding figures in the marine industry, died suddenly at his home in New York on Jan. 6. He had been ill but one day and death was due to a heart attack. He was 64 years old.

Captain McAllister was born in Dorchester, N. J., on May 29, 1867, the son of a ship carpenter who had come from Scotland. After spending his early years at City Island, where his father operated a shipyard, he entered Cornell university on a scholarship to prepare for a sea career, graduating in 1887 as a mechanical engineer. He served as a draftsman in the Cramp shipyard at Philadelphia and then joined the navy department in the same capacity, later shifting to the revenue cutter service of the United States coast guard, where he served for 30 years. At the outbreak of the Spanish-American war he was directed by President McKinley to list those ships of the revenue cutter service which he considered would be valuable to the navy. He served during the war as assistant engineer on the U. S. S. flagship PHILADELPHIA, returning to the coast guard service after the war. In 1919 he retired from the coast guard service with the rank of engineer-in-chief to become vice president of the American Bureau of Shipping. He was made president of the Bureau in 1926.

Captain McAllister was internationally known as an authority on ship construction and marine engineering and for many years devoted his talents to the improvement of shipbuilding conditions as well as operation. He was an untiring worker in the campaign to obtain federal aid for merchant ships through construction loans and mail contracts and worked unceasingly for the passage of the Jones-White bill, on which the merchant marine act of 1928 was based. He recently urged a government appropriation of $125,000,000 for the construction of 100 fast modern freight ships to replace antiquated tonnage and provide employment in American shipyards and in the last issue of the bimonthly bulletin of the American Bureau, which reached shipping men shortly before news of his death, he strongly urged that a nationwide campaign of education on the American merchant marine be conducted by shipping men during the new year.

He served as a delegate to the international conference on safety of life at sea in London in 1929 and acted as chairman of the Fuel Conservation committee appointed by the United States shipping board, being active in the experiments to reduce operating cost by using pulverized coal. He was vice president of the Society of Naval Architects and Marine Engineers; trustee of Webb Institute of Naval Architecture; trustee of American Merchant Marine Library association, associate member of U. S. Naval institute and member of New York State chamber of commerce; Engineers club, National Press club of Washington, Block Hall, American Society of Naval Engineers, Naval and Military Order Spanish-American War, Jury on Awards on Machinery at the San Francisco exposition in 1915, executive committee of the American Marine Standards committee. He is survived by his wife, Mrs. Adelaide Kenyon McAllister and one daughter, Miss Clara A. McAllister.

A THOROUGH-going American with a trained and alert mind and a rich personality, inspiring friendship and confidence, he had grown to be one of the outstanding leaders in the cause of our merchant marine. It is too soon to estimate the extent of his labors or the amount of permanent good which he contributed in placing the American flag on the way to an attainment of its proper heritage on the sea. He was equally valiant as friend or foe. A friend

of every sound effort to increase the effectiveness and prestige of our merchant marine; a foe of every effort, no matter how powerfully sponsored, promoting the power and prestige of any foreign flag at the expense of our own on the high seas. But for all his ardent Americanism and strong convictions as to our rightful place on the seas he recognized and applauded the intelligent enterprise and seamanship of our maritime rivals. He was a fair fighter and received the admiration and respect of all who knew him.

Alfred A. Howitz Dies

Alfred A. Howitz, chief engineer of the Sun Shipbuilding & Dry Dock Co., Chester, Pa., died recently after a long illness.

Mr. Howitz graduated from Lehigh University in 1894 and immediately took up a position with the Newport News Shipbuilding & Dry Dock Co., remaining with that company for 14 years. He later became assistant chief engineer of the New York Shipbuilding Co., Camden, N. J., a position he held for eight years, leaving that company to become chief engineer of the Sun Shipbuilding & Dry Dock Co. on its organization in 1916, which position he held at the time of his death.

Mr. Howitz was a member of the Society of Naval Architects & Marine Engineers and of the American Society of Naval Engineers.

District Manager Dies

Harold Brooks Gardner, eastern district manager of the Westinghouse Air Brake Co., with headquarters in New York, died at his home, New Rochelle, N. Y., Jan. 2 after a brief illness.

Mr. Gardner entered the employ of the Westinghouse Air Brake Co. in 1923 as representative in the eastern district. In 1926 he was made general sales manager of the Westinghouse Friction Draft Gear Co. with headquarters at Chicago, returning to the parent company in 1927 as assistant to the resident vice president at New York. Early in 1929 he was appointed assistant eastern district manager and six months later was advanced to the position of district manager, which position he was occupying at the time of his death.

European Shipping Poorest Since 40's

Abandonment of Gold Standard by Great Britain Leads to Increase in Exports—Increasing Tendency to Subsidize Tramp Shipping

By Frank C. Bowen

THE year 1931 is certainly one that has ended without the least regrets from anybody connected with the shipping and shipbuilding industries, for in Britain at least it has, comparatively speaking, been the worst shipbuilding year since records were first taken, in actual figures the worst since 1887, and in shipping the worst since the forties. Unfortunately there is no sign of a counterpart to the guano trade to appear suddenly as it did then and lift the industry out of the slump.

Mr. Walter Runciman was appointed president of the board of trade in the new cabinet, fresh from the colossal job of straightening out the finances of the Kylsant group. It was the first time for many years that a practical shipowner had been chosen for this post, but there is no doubt it was a wise move in the unusual circumstances in which the industry found itself and great benefits are expected. It is, perhaps, a little hard that force of circumstances should attach the name of a life-long free trader like Mr. Runciman to the new duties.

As far as British trade is concerned there was naturally a considerable increase in exports immediately the country went off the gold standard but it has been more than balanced by decreased imports after the initial dumping movement. Freights had been bad for the whole year, generally very bad indeed, with slight revivals from time to time which are rather difficult to explain. For instance there was no apparent reason for a considerable revival in the River Plate trade in the autumn, but it attracted a number of empty ships out there on speculation which were later willing to accept almost any price rather than be tied up indefinitely or be forced to make the second voyage in ballast.

Only in the few surviving sailing ships on the Australian grain trade can freights be regarded as reasonably satisfactory, for this year a number have gone out to pick up grain in South Australia at from 30 shillings to 31 shillings and sixpence, while last year the rate offered was anything down to 13 shillings and sixpence. Several of the sailing ships have changed hands during the quarter, including the big PARMA, which has been bought by an Anglo-Finnish syndicate for the main purpose of training cadets. The famous Belgian training ship L'AVENIR has completed her last cruise and is to be replaced by a very much smaller diesel auxiliary barque of 700 tons which is now completing at Leith.

There are steadily increasing tendencies to bring pressure on the various European governments to subsidize tramp shipping, and recently France, Italy, and finally Germany have been the subjects of campaigns in this direction. The tramp shipowners with higher standards of living are maintaining that they cannot live against the Greeks, Spanish and suchlike without direct government aid, but they have to contend with the experience of the French government with navigation bounties under the acts of 1881 and 1893, bounties which cost the state large sums but which were of very little benefit to the merchant service. Both France and Italy, of course, already have a far-reaching subsidy system, but except for special imperial purposes, Germany has always been against the principle and in her case it is most unlikely that those in favor of a navigation bounty will get their way.

Three Historic Incidents

In the Atlantic trade the last quarter of the year has seen three historic incidents. Firstly the French government came to the aid of the Compagnie Generale Transatlantique and although they have kept the company above water there is likely to be considerable political bother about the methods adopted. Secondly the big Italian shipping merger which has been in the air for some time was completed in October and the Italia group came into being, combining the fleets of the Navigazione Generale Italiana, Cosulich line and Lloyd Sabaudo. This amalgamation will certainly lead to a rationalization of the Italian services to North and South America and it has already been announced that there is a strong probability that it will lead to the construction of a third record breaker of round about 50,000 tons to run alongside the REX and CONTE DI SAVOIA. A similar group of Italian companies running to the East has also been formed.

Thirdly there was the sudden announcement that the Cunard line was suspending the construction of the giant 73,000-ton record breaker under way at John Brown's yard at Clydebank, the reason given being that it was impossible to obtain the necessary money at reasonable rates from the banks. There was immediately a popular campaign for the government to step in and take measures to assure the construction of this ship, in which the public has taken tremendous interest, and that campaign is still in progress.

The most popular suggestion is that the government shall guarantee the necessary loans of the company just as it did for several other companies under the Trades Facilities act, but it must be remembered that Mr. Runciman came to the head of the board of trade straight from the Kylsant group, and that in his work on that unfortunate body he had ample evidence of the trouble that both the British and Ulster governments are in through guaranteeing construction loans for the various companies of the group. It is very certain that he will not be enthusiastic over any revival of the measure.

The appeal of Lord Kylsant against his sentence of imprisonment having failed great attention has been centered on the efforts of the committee to get the group which still bears his name on to its feet again, or at least to save as much as possible. It is a tremendous job that they have tackled and they have had to ask for an extension of the moratorium again and again, but it is generally understood that they have been making excellent progress and that as a result of their efforts the situation will not be as bad as was generally anticipated. No details of their plan of reconstruction have yet been published, but it has been announced that one of the first things to be done is to rationalize the South American services and run them under one company. At present overhead charges are wasted through practically the same ground being covered by the Royal Mail Steam Packet Co. and its subsidiary the R. M. S. P. Meat Transports, the Pacific Steam Navigation Co., Nelson line, Messrs. Lamport & Holt and their associated Liverpool, Brazil & River Plate Co., and the MacIver line. Many redundant units have been sold, generally to scrappers, and most recently Lamport & Holt's post-war VOLTAIRE is reported to have been bought by the promoters of a scheme for running a transatlantic service under the Greek flag with a big sub-

Trend of Trade and Shipping in British Isles

	September	October	November	Eleven months ended Nov. 30, 1931	1930
Total entrances of cargo ships into British ports:					
Number of vessels	4,952	4,795	4,443	50,998	53,131
Tonnage	5,348,231	5,218,284	4,984,437	55,442,779	58,592,236
Tonnage from Atlantic coast of North America	1,227,525	983,622	873,137	10,442,078	12,281,065
	(23%)	(18.9%)	(17.5%)	(18.9%)	(21%)
Total clearances from British ports:					
Number of vessels	4,786	5,116	4,483	50,916	56,323
Tonnage	5,025,821	5,376,872	4,599,036	53,733,884	60,964,341
Tonnage going to Atlantic coast of North America	859,317	862,133	651,211	8,639,848	9,947,525
	(17.2%)	(16.1%)	(14.2%)	(16.1%)	(16.3%)
Total value of goods:					
Exported	£33,607,132	£38,109,010	£36,830,264	£415,585,295	£613,830,639
Imported	£68,317,926	£80,684,561	£83,231,443	£785,205,986	£955,225,830
Exports of coal:					
Tons	3,584,109	3,950,972	3,542,551	39,122,250	50,632,504
Value	£2,942,983	£3,235,656	£2,890,134	£31,720,810	£42,208,794
Tonnage shipped for use of steamers	1,215,753	1,371,668	1,308,830	13,345,262	14,340,547

sidy from the Greek government.

Turning from the shipping to the shipbuilding side, in Britain there is the same melancholy story to tell. During 1930 things were regarded as disastrous when the percentage of unemployment increased from 23 to 45, but in the latest return made in November the average was 60 per cent of all the skilled workmen in the country and 70 on the Clyde and North East Coast which are the districts most affected.

The continental shipbuilders are hit nearly as hard as the British, several having been forced into liquidation while others have decided that there is more profit in shipbreaking and, in one case, in converting the business completely to printing and bookbinding.

The quarter has been conspicuous for the small number of really noteworthy ships launched or completed. The P. & O. CARTHAGE and CORFU have been finished and put on to the far eastern service, geared turbine ships with a gross tonnage of over 14,000 and a trial speed of 20 knots. On their advent the company is selling the ships of the "K" class which were specially designed for the same service in and around 1914, ships of 9000 tons gross with a speed of 14½ knots with reciprocating engines.

Messrs. Harland & Wolff of Belfast launched the White Star liner GEORGIC in November, an exact sister of the BRITANNIC which is already on the company's cabin service and which is said to have proved the most successful Atlantic liner during the past year. The same firm launched for the Nelson section of the Kylsant group the motor passenger ship HIGHLAND PATRIOT, which is an exact sister to the lost HIGHLAND HOPE which she replaces.

The Furness-Withy turbo-electric ship MONARCH OF BERMUDA, designed to run from New York to the Island, has already been very fully described in the American press but it may be mentioned that her service performances have exceeded all expectations. While she was receiving her finishing touches her predecessor, the diesel-engined BERMUDA which was in Belfast being refitted after her fire, caught fire once again and this time was destroyed hopelessly. The underwriters have paid something like 180 per cent on this ship during the year, the second loss on the ridiculously inadequate building risks premium which is likely to be rectified, but the order for a second MONARCH OF BERMUDA which was placed immediately is the only really bright spot in shipbuilding during the quarter.

On the continent the most noteworthy ship to take the water is the 20,000-ton motor liner NEPTUNIA, the first of the two liners which are building for the South American service of the Cosulich line. They are primarily passenger ships but will have stowage for about 7200 tons of cargo while the four screws will be coupled directly to diesel engines totaling 20,000 horsepower. They will introduce the luxurious cabin class to the South American service and it is hoped that they will be as successful as the BRITANNIC and LAFAYETTE have been on the western ocean.

For several years past there has always been some member of the shipping industry who finishes up the year with a note of optimism, but each year has shown results worse than the last. This year's optimist is Mr. W. A. Souter, head of the Sheaf line and president of the Baltic conference. He expressed the belief that shipping had now turned the corner and despite previous experience this opinion is given added weight by the fact that his experience of tramp shipping is vast and his judgment is always treated with great respect by his fellow shipowners.

Marine Society Dinner

The one hundred and sixty-second annual dinner of the Marine Society of the City of New York was held Jan. 11 and was attended by nearly 200 members and guests. Those at the guest table were: Capt. Ralph B. Drisko, the Rev. Dr. Otto H. Mohn, John P. Magill, J. Barstow Smull, Montague Lessler, Kermit Roosevelt, J. D. Mooney, Dr. Oswald S. Lowley, D. Gardiner O'Keefe and William Simmons. All officers of the society were re-elected at the annual meeting held during the afternoon in the board room of the Produce Exchange.

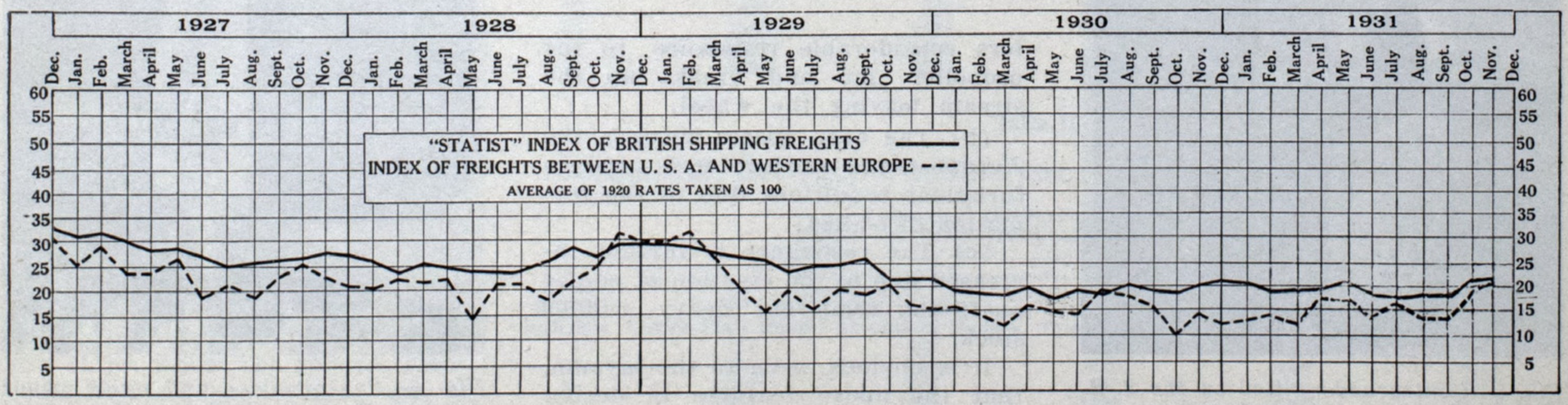


Diagram showing fluctuation of ocean freight rates for four years and eleven months

Rudder Efficiency in Modern Design

The Contra-Rudder

By C. H. Brown

THE last decade witnessed an unusual development in ship rudder design accompanied by the granting of patents both here and abroad for various types of rudders, in all of which the outstanding feature is the stream-lining of the rudder and sternpost. The reason for this movement is that competition has made speed and economy more and more important, and any factor contributing toward improved operation is readily adopted once its merits are recognized.

It will be recalled that prior to the adoption of the single plate rudder, which has been standard practice for the past thirty to forty years, the double plate rudder was in general use. This rudder was in effect, a partly streamlined rudder, when as a matter of economy in construction, it was superseded by the single plate rudder. It would appear that those responsible for the change gave no thought to the losses incurred by the increase in resistance and the creation of turbulent water conditions around the rudder.

The objectionable features of the standard type of stern frame and single plate rudder, as shown in Fig. 1, may be stated as follows:

(a) The rectangular sternpost of-

The author, C. H. Brown, is a member of the engineering department of the Th. Goldschmidt Corp.

THIS is the third of a series of articles on modern types of rudders. The first article, on the Simplex rudder, appeared in the December issue. The second article, on the Oertz rudder, appeared in the January issue.

Editor's Note.

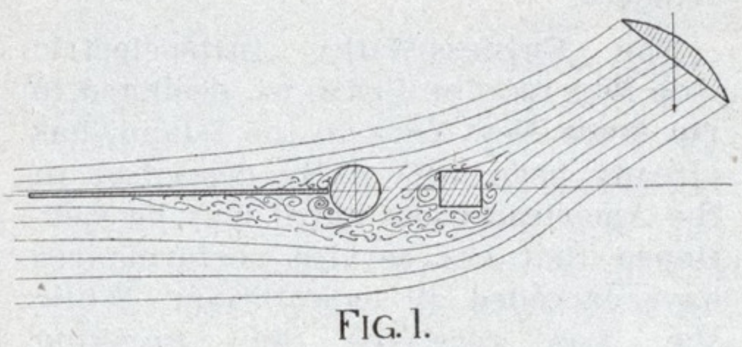


FIG. 1.

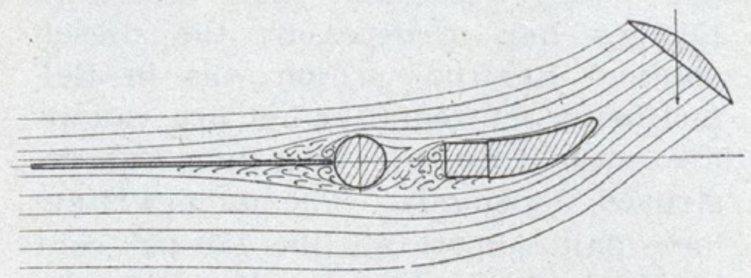


FIG. 2.

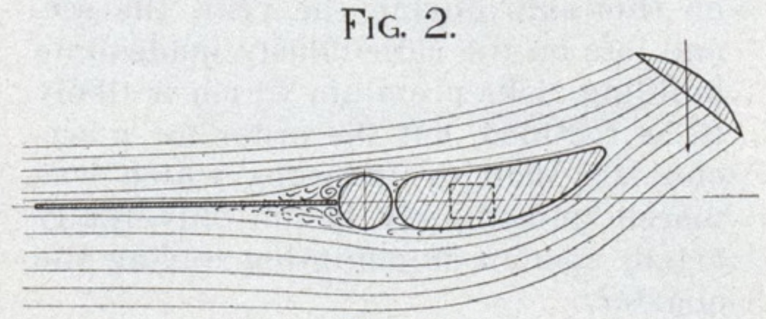


FIG. 3.

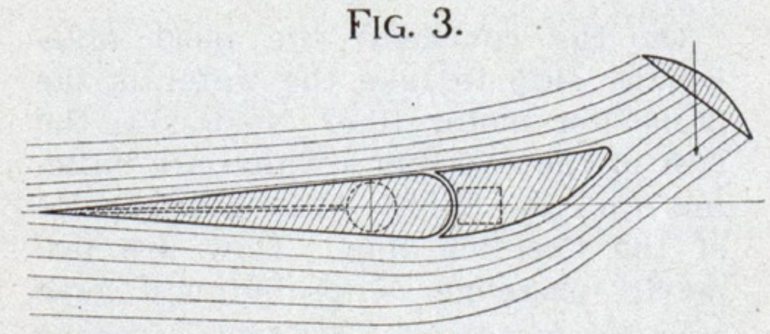


FIG. 4.

Fig. 1-4—*Development of the Contrapropeller and Contrarudder. Fig.* 1 *being the customary rectangular section sternpost*

fers considerable resistance to the propeller jet and breaks up the stream leaving the wheel.

(b) The open spaces between the sternpost and rudder stock produce turbulent conditions due to the formation of eddies.

(c) The resistance is further increased due to the creation of eddies abaft the relatively heavy rudder stock.

It is obvious, even to the layman, that the above features in design must cause first, a decided decrease in propulsive efficiency, and second, because of the turbulent condition of the water passing the rudder, the necessity of a much greater angle of helm for steering the vessel.

Early Experiments in Rudders

While attempts were made during the past century to improve propulsive efficiency by the introduction of guide vanes abaft the propeller, notably the Rigg stator in 1866 and Thornycroft's design in 1883, the results of these experiments apparently did not justify their adoption as they were discontinued.

Nothing further in this line was attempted until 1912 when Rudolph Wagner, the well-known German engineer, conceived the idea of incorporating the theory of turbine blade design with that of streamline flow, his object being to change the rotary motion of the propeller discharge by guiding or deflecting it in a direct rearward stream. In view of the purpose for which it was developed, Dr. Wagner named his device the Contrapropeller.

The experimental work that was underway up to 1914 was completely stopped during the World war and not until 1920 was it resumed. Figs. 2, 3, and 4 show diagrammatically the gradual development of the Contrapropeller idea.

In Fig. 2, it will be noted that

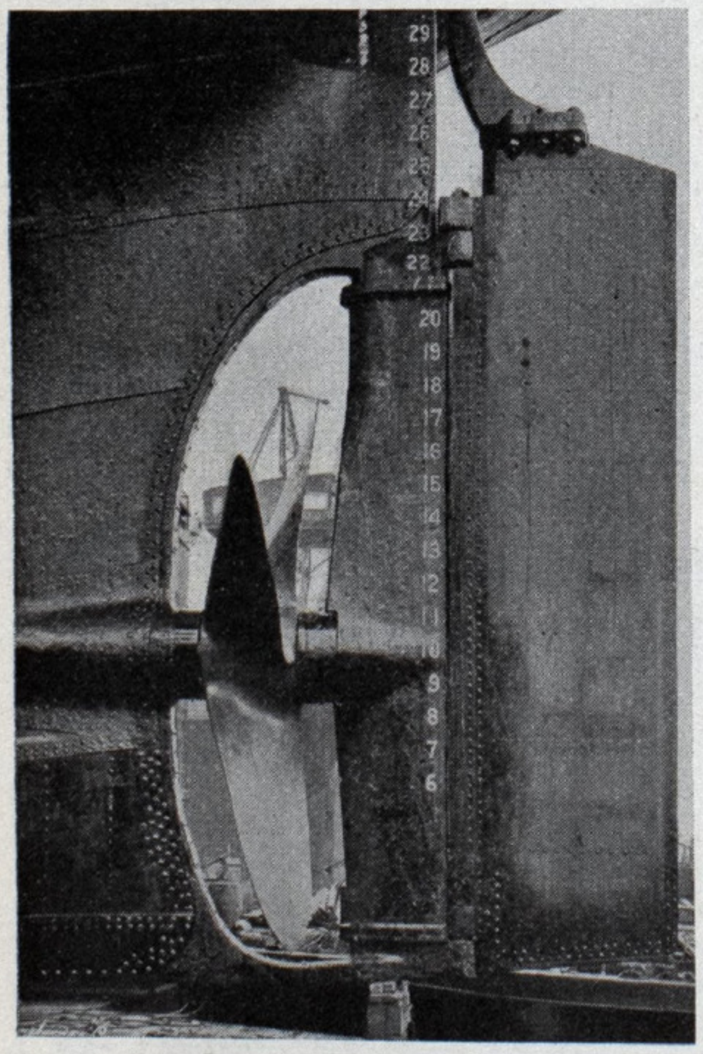


Fig. 5—*Contrarudder fitted on the S. S. William N. Page, a typical medium size cargo vessel*

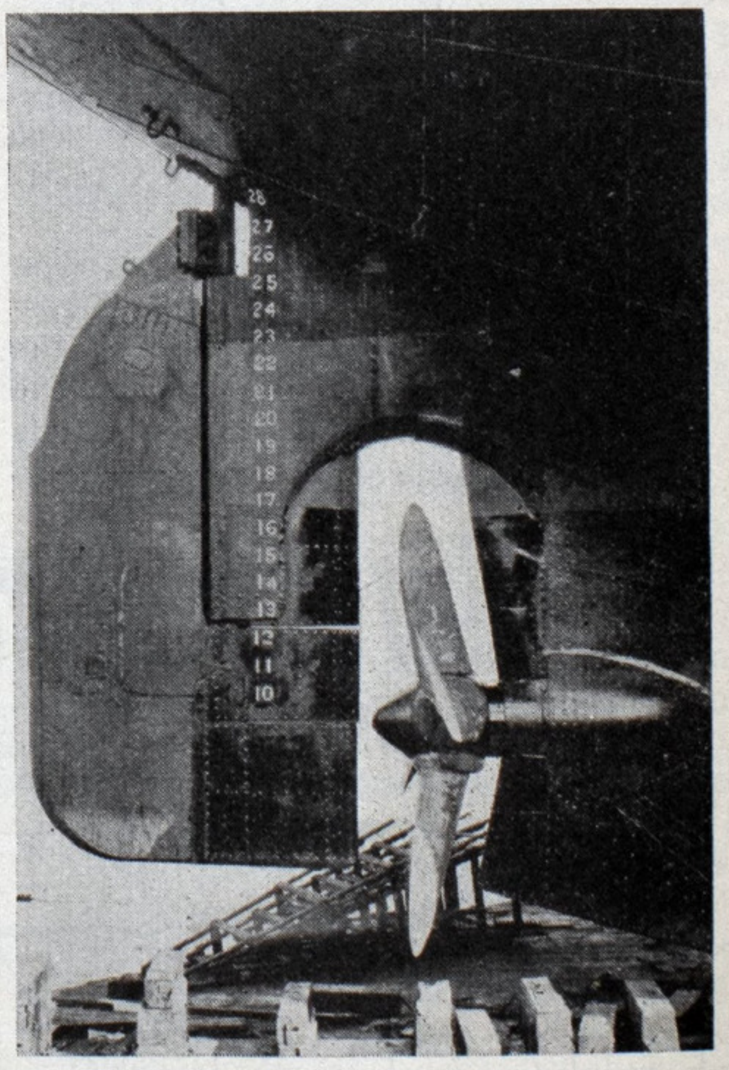
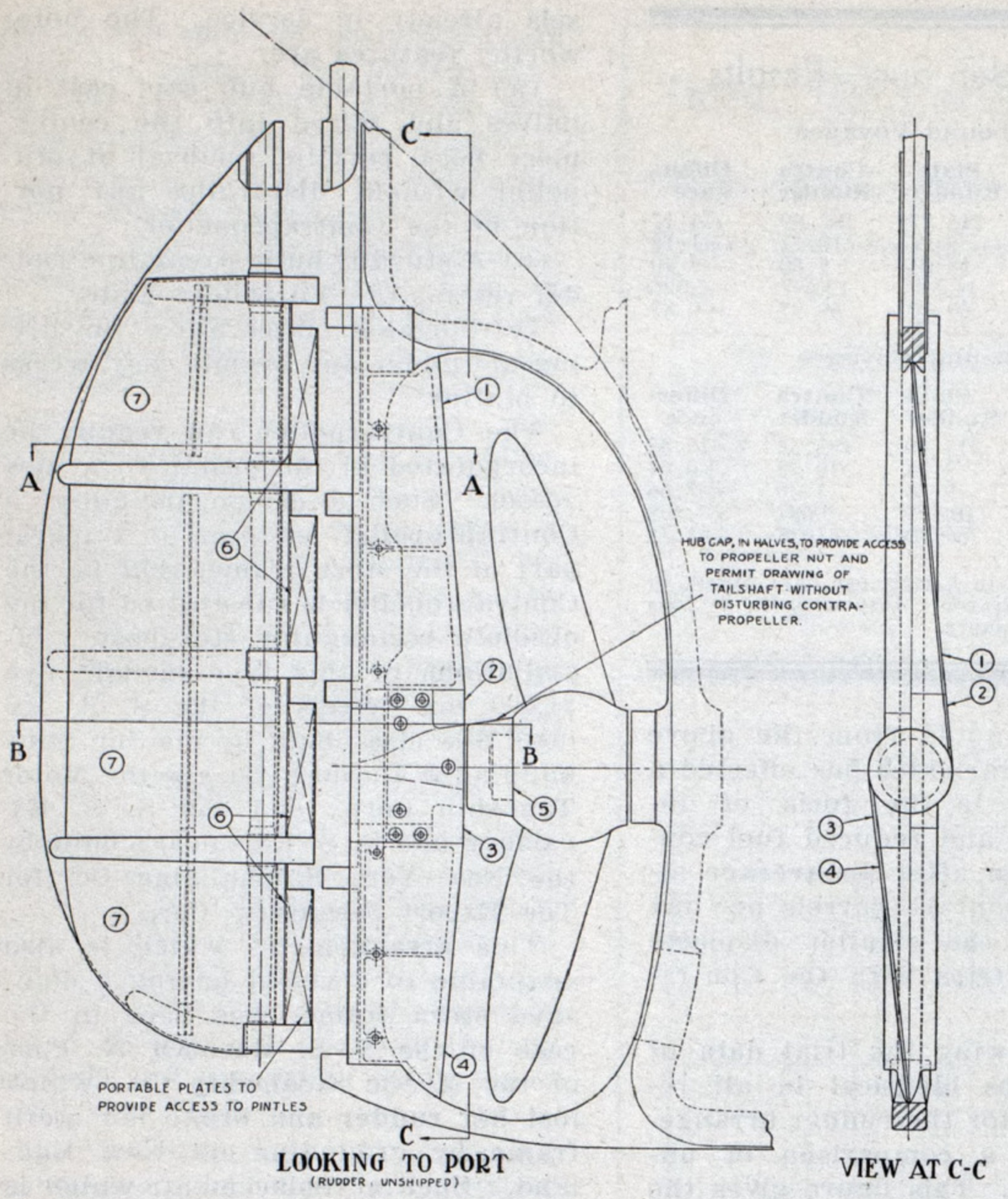
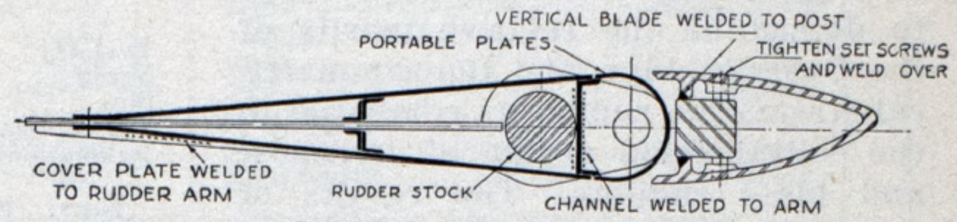


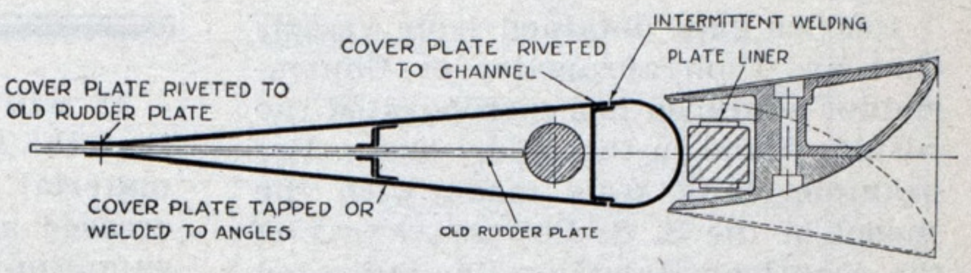
Fig. 6—*Contrarudder and guide vanes fitted on the S. S. DelNorte—Hog Island "A" type*



BILL OF MATERIAL		
MARK	NAME	MATERIAL
1	UPPER VERTICAL BLADE	CAST STEEL
2	PORT CENTER PIECE	CAST SEMI-STEEL
3	STARBOARD CENTER PIECE	" " "
4	LOWER VERTICAL BLADE	CAST STEEL
5	HUB CAP	CAST IRON
6	PORTABLE PLATES	MILD STEEL
7	RUDDER COVER PLATES	" "



SECTION AT A-A



SECTION AT B-B

CONTRARUDDER
AS FITTED TO A SHIP IN SERVICE

Fig. 7—Design of Contrarudder fitted to a ship in service

the Contrapropeller, a curved prolongation of the sternpost, intercepts the propeller discharge and deflects it aft in a solid stream. There remains, however, the turbulent water conditions abaft the sternpost and abaft the rudder stock.

In Fig. 3, the Contrapropeller is designed to line up with the outside diameter of the rudder stock, and is carried around and aft of the sternpost so as to fill the space between the sternpost and rudder stock. This has proved a very efficient design and can be fitted to vessels in service at very small cost.

The Contrarudder Principle

Fig. 4 is typical of the latest design, showing the Contrapropeller combined with streamline rudder, the combination being known as the Contrarudder. The resemblance of the Contrarudder section to that of an airplane wing is not more marked than is intended, as the principles employed in designing the airplane wing to give maximum lift with minimum resistance in flight are followed with equally good results in designing the Contrarudder.

It is usual when talking of streamline rudders to conceive the streamline body as being towed behind the vessel through a mass of water moving in the opposite direction and parallel to the centerline of the ship. In the case of twin and quadruple screw ships, where the rudder is not located in the propeller race, this is of course, correct. However, it is obviously wrong in the case of single screw ships where the rudder is directly behind the propeller and where the water does not flow in a direct rearward stream but is thrown athwartships by the propeller at a considerable angle to the centerline of vessel, that is, to starboard above the centerline of shaft and to port below the centerline.

In this case, a symmetrical shaped rudder impedes the flow from the propeller. This condition does not exist when a Contrarudder is used, since the Contrapropeller portion, being offset to port above the centerline of shaft and to starboard below, properly guides the water from the propeller. Thus by assisting the water to get away from the propeller instead of retarding it, the Contrarudder increases the velocity of the propeller discharge, resulting in increased thrust for the same horsepower, or if speed is to remain constant, decreased horsepower for the same speed.

At the same time, due to the turbine blade-like shape of the Contrarudder, the reaction of the propeller

Table I

Comparison Between Plate, Streamline and Contrarudders

Principal Dimensions of Ship
Length between perpendiculars..... 250 feet
Beam ..... 42 feet
Draft ..... 16 feet
Displacement .....1975 tons

SPEED	SHAFT HORSEPOWER			PER CENT REDUCTION IN S. H. P.	
in Knots	Plate Rudder	Streamline Rudder	Contrarudder	Streamline Rudder	Contrarudder
9	400	370	320	7.5	20.0
10	560	520	440	7.2	21.4
12	960	900	790	6.25	17.7
14	1580	1480	1320	6.3	16.5
16	2640	2400	2200	9.1	16.7
17	3580	3200	3000	10.6	16.2

Table II

Comparison Between Double Plate, Streamline and Contrarudder

Principal Dimensions of Ships
Length between perpendiculars..... 290 feet
Beam ..... 45.5 feet
Draft ..... 17.4 feet
Displacement .....5000 tons

SPEED	SHAFT HORSEPOWER			PER CENT REDUCTION IN S. H. P.	
In Knots	Double Plate Rudder	Streamline Rudder	Contrarudder	Streamline Rudder	Contrarudder
8	467	449	439	3.86	6.00
9	685	648	620	5.40	9.50
10	940	880	830	6.38	11.70
11	1268	1210	1119	4.75	11.75
12	1800	1748	1610	2.90	10.60

stream in being guided directly rearwards, imparts additional useful thrust in the direction of motion of the vessel. Fig. 8 shows the method of developing a Contrarudder blade. It should be noted that for every section of the propeller blade there is a corresponding Contrarudder section so designed as to properly accommodate the flow at this point.

Proof of the foregoing statements is found in model basin tests made to determine the relative merits of the Contrarudder, and the symmetrical streamline rudder as compared to the conventional design of sternpost and plate rudders. The results of two such tests are found in Tables I and II.

Service data obtained from vessels that are Contrapropeller or Contrarudder equipped has corroborated the results found in the model basin. For example, tank tests made with the model of the S. S. PENNSYLVANIAN of the American Hawaiian line indicated that a saving in power of 14 per cent at 11.75 knots might be expected when this vessel was equipped with a Contrapropeller of the type shown in Fig. 3. An examination of this vessel's performance over a three year period after the fitting of the Contrapropeller shows a saving in power of 14.12 per cent which closely approximates the results found in the tank.

Good Results in Actual Service

The American Hawaiian line followed up the Contrapropeller installation on their S. S. PENNSYLVANIAN with a Contrarudder installation on their S. S. GOLDEN SUN, a vessel of 11,000 tons capacity engaged in the transpacific trade. An examination of her logs over a period covering a year's service before and after the Contrarudder installation gave the following results:

S.S. Golden Sun—Results

Westbound Voyages

	Plate Rudder	Contra Rudder	Difference
Fuel Oil.....	216.77	192.60	—24.17
Speed.....	8.94	10.12	+1.18
Slip.....	18.04	8.60	—9.40
Displacement...	14,787	12,697	—2,090
Revolutions....	69.10	69.97	+0.87

Eastbound Voyages

	Plate Rudder	Contra Rudder	Difference
Fuel Oil.....	215.40	185.58	—29.82
Speed.....	9.94	10.58	+0.64
Slip.....	9.36	1.70	—7.66
Displacement...	10,495	9,687	—808
Revolutions....	69.10	67.35	—1.75

Note: Fuel oil, in barrels per day; Speed, in knots; Slip, in per cent; Displacement, in tons Revolutions, per minute.

It will be noted from the above that the Contrarudder has effected a material gain in the form of increased speed and reduced fuel consumption, even after an average allowance of about 15 barrels per day is made for the smaller displacement on the trips with the Contrarudder.

Fig. 9, showing the trial data of two sisterships identical in all respects except for the rudder arrangements, gives a comparison of unusual interest. This figure gives the results obtained over the measured mile under similar conditions and also indicates the types of rudder arrangements used. It will be noted that although the rudders are identical, the M. S. NORVINN has a rounded sternpost while the M. S. NORFOLD has a Contrapropeller which serves as a sternpost. Due to the influence of the Contrapropeller, the NORFOLD was able to maintain the same speed as her sister ship with 14 to 17 per cent less horsepower.

Fig. 7 shows the most improved design of Contrarudder fitted to vessels already in service. The noteworthy features are:

(a) A portable hub cap, cast in halves and faired into the centerpiece boss, permits removal of propeller without disturbing any portion of the Contrapropeller.

(b) A sturdily built streamline rudder retains the old rudder plate.

(c) Portable plates allow for lifting of rudder and permit easy access to pintles.

The Contrarudder can readily be incorporated in the design of a new vessel. Such a design includes a Contrapropeller made as an integral part of the stern frame, that is, the Contrapropeller is substituted for the obsolete rectangular sternpost. Installations of this type include five 21,500 ton vessels of the S. S. PACIFIC SUN class, built by the Sun Shipbuilding & Drydock Co. for the Motor Tankship Corp., and the S. S. EXCALIBUR and S. S. EXOCHORDA built by the New York Shipbuilding Co. for The Export Steamship Corp.

This arrangement, which is also adaptable to a vessel having a damaged stern frame, was used in the case of the S. S. WILLIAM N. PAGE of the Mystic Steamship Co., which lost her rudder and broke her stern frame by grounding off New England. Such a replacement, which is illustrated in Fig. 5, can be made for practically the same cost as would be required to renew the conventional stern frame and plate rudder.

Application on Hog Island Ships

A class of single screw vessels deserving of notice is the Hog Island "A" type ships, in which a semi-balanced rudder replaces the conventional stern frame and rudder. This class of vessels has proven very popular, and several companies operating them are undertaking to increase their speed from 10.5 to 13 knots to fulfill mail contract requirements.

One such company is the Mississippi Shipping Co., operating between New Orleans and the East coast of South America, who have converted two Hog Island ships into modern passenger vessels. Besides adding passenger accommodations and overhauling the machinery and power plant, a Contrarudder and Contrapropeller guide vanes were fitted to the first ship, the DEL NORTE, as illustrated in Fig. 6. From this photograph it will be noted that the existing rudder balance was replaced by a section employing the Contrapropeller principle, together with guide vanes installed forward of the propeller which also have the Contrapropeller curvature.

The DEL NORTE averaged 13.76 knots oved a 90-mile course between Mobile Sea Buoy and South Pass, and to date has averaged over 13 knots loaded on the two voyages made from New Orleans to Rio de Janeiro against the adverse current encountered on this run. In addi-

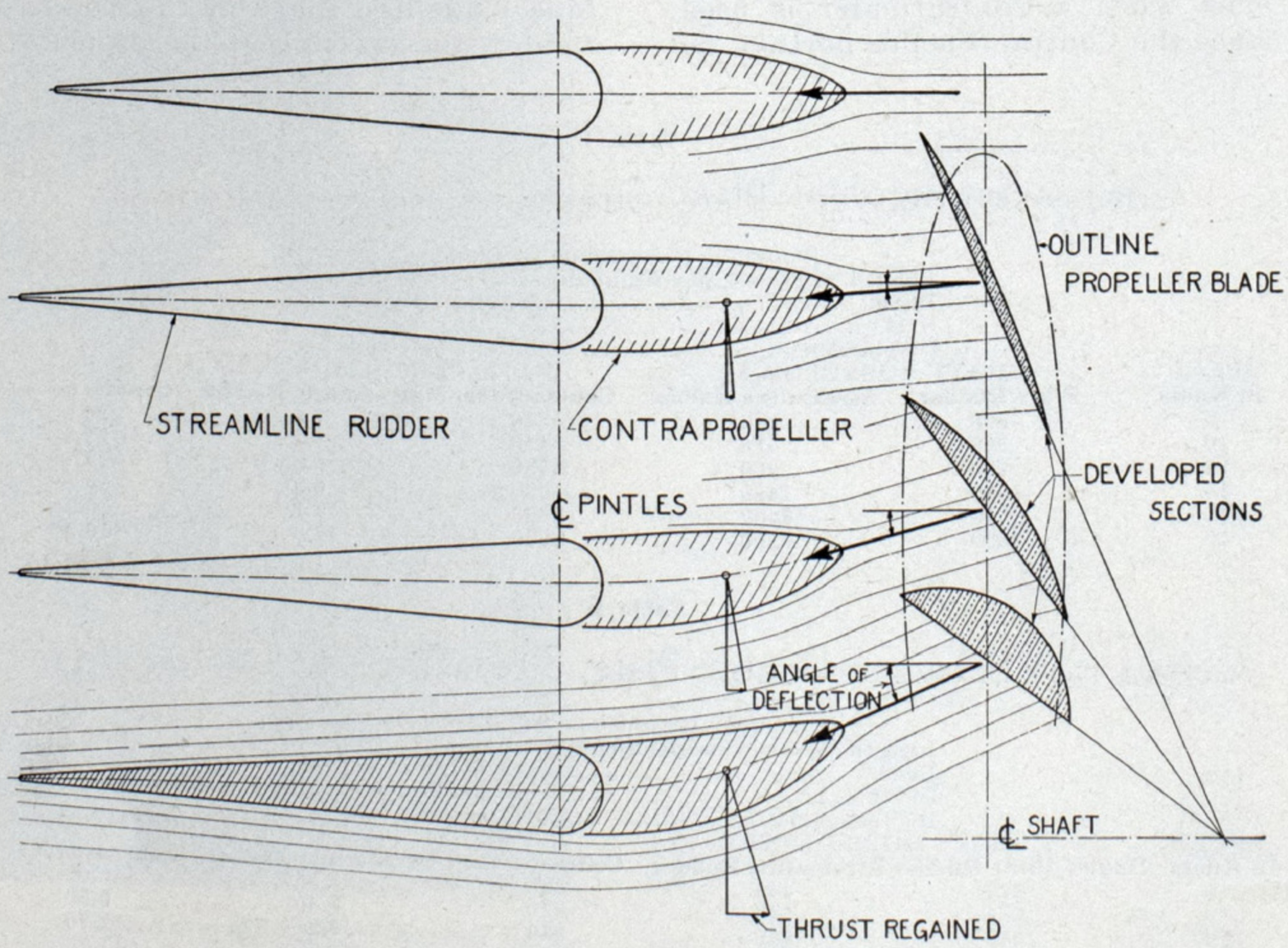


Fig. 8—Showing principle of Contrapropeller action

tion to the splendid performance in speed, the steering and maneuvering qualities are excellent, and the ship is remarkably free from vibration.

It is axiomatic that a streamline rudder will greatly improve the steering and maneuvering qualities of a vessel. This is especially true of the Contrarudder, as the fixed Contrapropeller portion by guiding the water aft in a straight rearward direction sends the water to the rudder in a solid stream, free of eddies, with the result that the ship responds immediately when given a few degrees of helm. Similarly, because of the Contrapropeller action when the rudder is amidships, there is an even distribution of pressure on both sides of the rudder so that the ship holds its course without yawing.

Large Reduction in Torque

Another advantage of the fixed section and streamline shape of the rudder, as compared to the single plate rudder, is the reduction in torque in the rudder stock, since the center of pressure is moved forward nearer the axis. A decrease of from 30 to 40 per cent when going ahead is not uncommon.

To date there are 164 American vessels equipped with Contrarudders and Contrapropellers. Prominent among the shipowners using the Contrapropeller and Contrarudder are the United Fruit Co. with 27 installations, The Isthmian line with 21 installations, the Texas Co. with 19 installations, the Pan American Petroleum & Transport Co. with 14 installations, and the Cities Service Transportation Co., 9 installations.

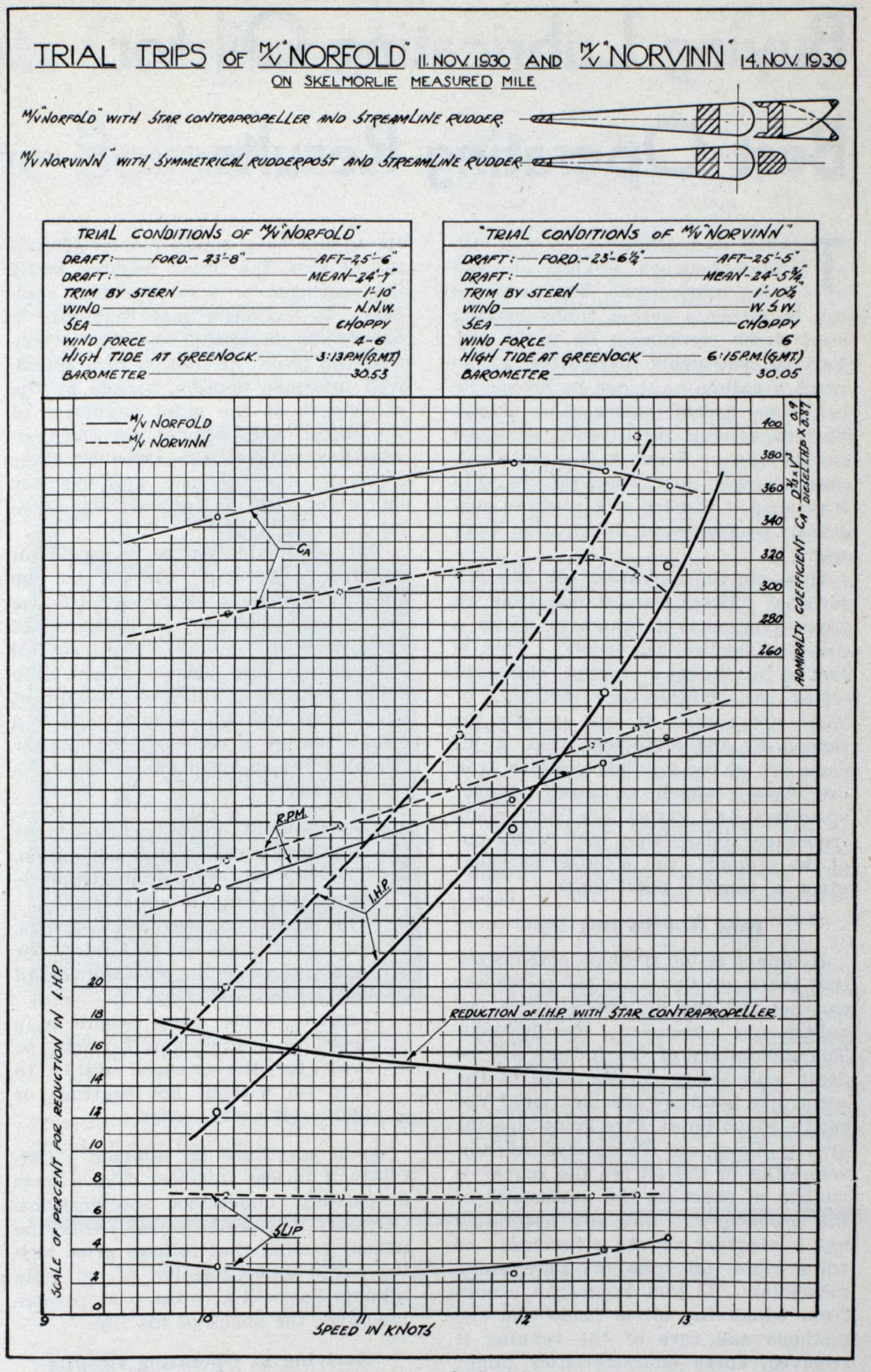


Fig. 9—Standardization trial performance of the M. S. Norvinn and M. S. Norfold

American Lines to Fight Cruises-to-Nowhere

Protest is being voiced by the American Steamship Owners' association through its president, H. B. Walker, against the operation of foreign flag liners on "cruises to nowhere," on the assertion that such cruises are a violation of the spirit of the coastwise laws of the United States. It is expected that Senator Wallace H. White, co-author of the Jones-White shipping act, will soon introduce a bill to amend the coastwise laws to prohibit the practice. United States shipping board commissioners, headed by T. V. O'Connor have also urged that legislation be enacted to stop the practice and A. J. Tyrer, commissioner of navigation, also has gone on record as favoring such legislation.

Foreign vessels were operated on cruises to nowhere for the first time in 1931 and the cruises proved an immediate success, as they offered short ocean voyages at extremely low rates. Unless legislation is enacted to put a stop to them it is expected that they will remain as a permanent feature in travel. The transatlantic companies entered on these short cruises in an effort to reduce their heavy losses in revenue as a result of the sharp decline in passenger and freight traffic last year.

The coastwise laws of the United States prohibit foreign flag vessels from transporting passengers or freight from one American port to another but they do not cover cruises to nowhere, with the result that foreign vessels can sail from New York without obtaining clearance papers and return there, providing they do not touch at any American or foreign port. American shipping men hold that the law was meant to apply to just such cases and they will press for legislation which will clear up any doubt that may exist.

The Hamburg-American South American liner CAP ARCONA, which arrived at Southampton on Dec. 29 from Buenos Ayres, made the voyage in the record-breaking time of 14 days, 19 hours and 45 minutes.

The time taken from Dio de Janeiro to Southampton was 11 days and 11 hours; fromt Lisbon, 40 hours, and from Vigo, 35 hours.

The CAP ARCONA is of 27,561 gross tons and entered the company's service in 1927.

Buying Lubricating Oil for Best Operating Results

THERE is a difference, a vast difference between buying oil and buying lubrication. The purchase can be either a rather tubby looking steel drum containing 50 to 55 gallons of petroleum derivative at so much a gallon, or it can be proper lubrication—a combination of an always uniform product intelligently designed for the unit on which it is to go, available wherever and whenever the ship may need it, backed and serviced constantly by competent lubrication engineers.

How can the purchaser tell this difference? There was at one time an expression current which is dying a deserved death—"Oil is oil". That is just as intelligent as saying "shoes are shoes" or "clothes are clothes," or "cars are cars." It was usually defended by the statement that it all came out of the ground. So does iron ore, later refined to steel. Butter spreaders and razors are both made from steel today—they both "come out of the ground"—but a butter spreader gives a mighty poor shave.

How Not To Buy Oil

It cannot be too strongly emphasized that there are two ways the purchaser can not tell the difference—price per gallon—and so-called specifications. The sad fallacy of the former will be dealt with later. In the case of the latter, just what are specifications? Viscosity. Flash Point. Fire Point. Specific gravity. Color, etc. These physical characteristics of the oil are the refinery's method of checking the uniformity of the product, *but they are absolutely not a measure of the correctness or value of an oil from the purchaser's viewpoint!* If you knew the crudes from which the oil is made and the methods and care of the refining it received, these characteristics might mean something. Not knowing this, they are actually misleading. If one manufacturer can make for you a number of oils of varying price values, low to high, with the same "specifications," can there be any possible contention that they represent a guide to the buyer?

How to Determine Real Quality

Is there any way in which the harrassed buyer of today seeking every possible cost cut, can definitely determine how to get the most lubrication for his money?

There is.

First of all it is unfair and unsound to ask the executive assigned to purchases to make the decision unaided. He should be a member of a committee of two—the other member being the operating or superintending engineer. It has been said that this is merely adding another "opinion" to confuse the issue. At that, it is a sound, well informed opinion, backed by the experience of the chief engineers of the ships. Why should not the man who has to keep the ships on their schedules and the men who live day and night with the engines themselves be consulted?

But it should not be a matter of "opinion." Driving directly at the heart of the whole matter, what is the one certain and correct indicator of the proper oil to buy? The over all cost of the ship operation, per ship mile. Is this an involved matter of charts and records? It is not. It is a simple matter of record which any superintending engineer has, or can readily compile.

1. The amount of oil consumed per ship mile times its cost per gallon.
2. The cost of repairs and replacements per ship mile.
3. The amount of wear on bearings, etc., calibrated and recorded per ship mile times the eventual cost of replacement or repair.
4. And in some cases where ship speed is a premium, a credit or debit for the engines' ability to turn up without hot bearings or undue oil consumption.

Could anything be simpler? Certainly it is less involved than a haze of partially understood specifications. Certainly it is more desirable than the uneasy feeling that follows price buying. And nine times out of ten, item number one will give the price-per-gallon-buyer the shock of his life.

Arriving at Operating Results

The purchaser may argue that this takes time to build up. That is one of the basic reasons why it is reliable. Take two or three established marine brands of oil and split the fleet up on them. Be certain that the oil is used as recommended by the supplier and in the quantities he recommends. Let the ship mile record build up for a few months or a year. Average the ships on each brand and compare them. The answer must be the correct one. You know something about oil then that cannot be offset by sales arguments.

Perhaps there are two other factors you may wish to add to the list, very important factors. The oil you select must be available at all ports of call—and uniform in every port. Your ship mile record will reflect this, too. The company from which you buy this oil must have a competent and trained staff of lubrication specialists (it's a science in itself that you cannot expect your busy chief engineer to master) ready to serve you as consultants. You will be surprised at the amount of money these men can save you with suggestions gathered from their experience on all types of ships under all flags.

Just by way of emphasis, there is at this moment an important ship on an important run out of New York, and she is operating on an improper lubricant bought at the lowest price per gallon quoted to the purchasing department of her company. The "specifications" were in line. She is in hard service and despite the efforts of the chief engineer not to push the vessel unduly, wear is taking place at a noticeably dangerous rate. Not many months from now there will be a heavy repair bill out of all proportion to the small difference in cost of the oils involved. Her gear set cost approximate $200,000 and the difference in price of an oil that would insure the safety of this unit and the oil she is using is only $200 a year.

Where Genuine Service Counts

A foreign owner employed a firm of consulting engineers in New York to care for his ships on this side. Trouble developed on one of them—plenty of trouble. In desperation they turned to a well known oil company with the statement that perhaps it was a lubrication problem for a lubricating specialist. It took two days to reach the ship in an inaccessible Canadian port and it took two hours to find the seat of the trouble and its remedy. That confidence and assurance in the supplier, that ready and intelligent assistance is not in a tubby steel drum and fifty gallons of oil at a price per gallon, and it saved the owner the cost of his whole year's oil bill.

Forget the price per gallon and remember the over all cost per ship mile. Forget the deceptive specifications and put in their place the ship mile record. Listen to your operating men and the men who live with the equipment. Do that and the man doesn't live that can sell you anything but the proper and most economical lubrication for your ships!

Less Passenger Trade

A decline of more than 350,000 in the number of passengers carried by the North Atlantic steamship lines operating between United States and Canadian ports and Europe outside of the Mediterranean is shown by the figures of the North Atlantic conference for the period from Jan. 2 to Dec. 24, 1931. Similar losses were shown in the Mediterranean westbound traffic.

Evaporative Tests Completed On New Marine Boiler

By E. C. Kreutzberg

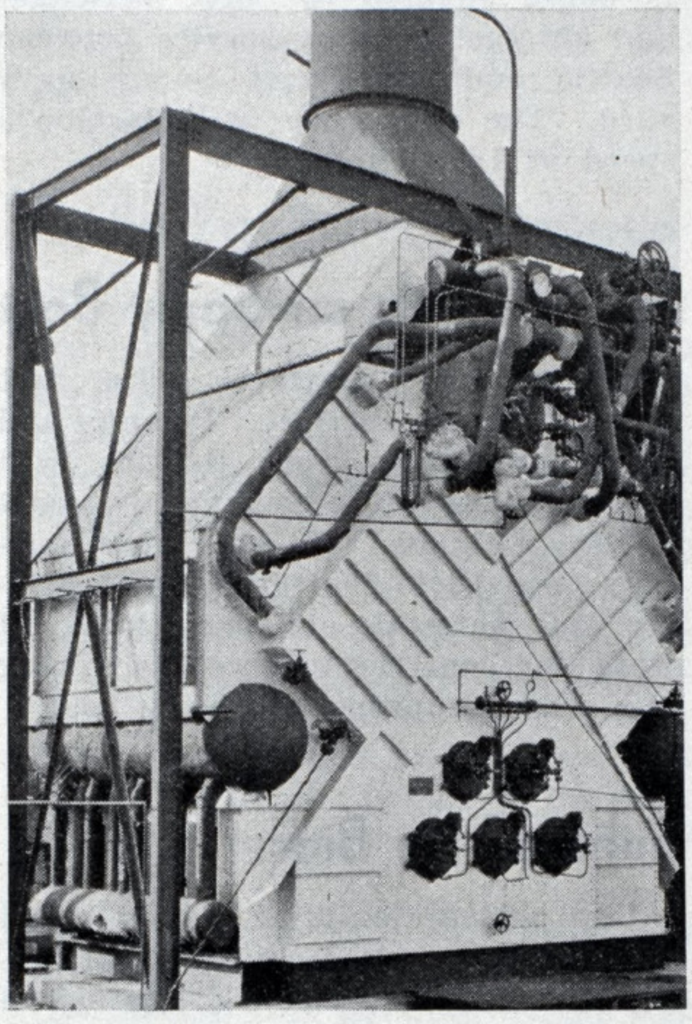
FINAL tests of the boilers built by the Foster Wheeler Corp., for installation in the steamships SANTA PAULA and SANTA ELENA, (see footnote) now under construction for the Panama Mail line at the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., were held Dec. 17 and 18 (see tabulation below) at the Foster Wheeler plant at Carteret, N. J.

Checked and certified results, given out by Foster Wheeler Jan. 14, show the overall thermal efficiency of the boilers to be 87.5 per cent.

This new marine steam generator, the builder claims, is a combination of previously proven and accepted designs, worked into a minimum amount of space without loss of efficiency. It has an unusually large furnace, in ratio to the heating surface of the boiler, thus permitting more complete combustion. It has water-cooled furnace walls, permiting high driving rates as the furnace may be forced without high furnace temperatures. Since it is a "cool" furnace longer than the average life for the firebrick lining is expected.

The end-walls and furnace floor are air cooled; the combustion air is passed down from the top of the rear wall through an air casing, then through a casing below the furnace floor, and up through a casing at the front of the furnace; the result is a moderate pre-heating of the air of combustion with such heat as passes through the furnace walls and floor, while the possibility of overheating the refractories is reduced.

By combining compactly these design factors, the builder has saved weight and space. Each ship will be equipped with four of these boilers. Each boiler consists of 81 tons of rolled steel, including some small castings, 10 tons of firebrick and the weight of the water is 10 tons per boiler. The entire boiler installation on each vessel will occupy space of 19,620 cubic feet. Each ship is 508 feet long with 72-foot beam, 39-foot depth, 25¼-foot loaded draft and measures 16,030 gross tons. Each will have a speed of 21 knots and 12,000-shaft horsepower. Each will be equipped with twin



Foster-Wheeler Marine Steam Generator After Conclusion of Trials. There are Five Todd Oil Burners

screws, driven by turbines through double reduction gears.

The new boiler has three drums which are larger in diameter than is customary. Bent tubing is used throughout. There are two rows of water tubes, 2 inches in diameter, on each side of the furnace. The remaining boiler tubes are 1½ inches in diameter and the superheating equipment consists of two banks of 1¼-inch tubes. The arrangement permits free water circulation, and provides room for complete combustion in the furnace. Interior cleaning of the boiler is facilitated; three manholes give easy access to all parts.

The centers of the mud drums are more than 6 feet above the floor line of the furnace. From the steam drum one row of 2-inch water tubes on each side of the furnace extend down to within a few inches of the floor line and then pass out through the furnace walls to headers which in turn are connected to the mud drums, thus providing for complete circulation. The side-wall firebrick and insulation between the steel plate walls and the water tubes can be and are so fitted that the brick cannot fall out of place. The front and rear walls are vertical and are faced with refractory-tile shapes which are held firmly in place by supports made of high temperature metal.

Each boiler is equipped with five Todd oil burners and has two economizer sections, one above each bank of boiler tubes. Superheating equipment consists of two banks of 1¼-inch tubes placed between the fourth and fifth rows of boiler tubes, counting from the furnace side. The evaporating section of the boiler consists of water tubes connecting the drums and steam is superheated by the distribution of the gases through the tubes. The gases first pass up through the superheater,

(*Continued on Page* 42)

There are four sister ships building at the Federal Shipbuilding & Dry Dock Co., all for the Grace interests. Two of these, the SANTA ELENA and SANTA LUCIA, are credited to Grace Steamship Co. and two, the SANTA PAULA and SANTA ROSA, to the Panama Mail Steamship Co. The SANTA ROSA and SANTA LUCIA are being fitted with Babcock & Wilcox boilers.

Official Tests—Foster Wheeler Steam Generator for Panama Mail Steamship Co.

Date of tests	Dec. 17	Dec. 18
Number of test	11	12
Duration of test, hours	4	4
Steam pressure in drum pounds per square inch	419	429
Steam pressure at superheater outlet	398	396
Final steam temperature, degrees Fahr	756	798
Superheat, degrees Fahr	306	357
Steam per hour, pounds	27,832	35,293
Oil per hour, pounds	2,087	2,793
Pounds steam per pound of oil	13.33	12.64
CO_2 in uptake, per cent	14.3	14.2
Temperature, gases in uptake, degrees, Fahr	282	317
Temperature of feed water entering economizer	163	138
Temperature of feed water leaving economizer	263	249
Moisture in steam, per cent	0.8	0.7
Heat added per pound of water, B.t.u.	1254.1	1310.1
Heat added per pound of oil, B.t.u.	16,750	16,560
Heat added per hour, (in 1000 B.t.u.)	3,490	4,623
Heat in fuel fired per hour, (in 1000 B.t.u.)	3,987	5,350
Heat in fuel per hour per cubic foot combustion space	36,450	48,900
Calorific value of fuel oil, B.t.u.	19,105	19,158
A Resume of the Heat Balance		
Overall thermal efficiency, per cent	87.5	86.0
Dry gas loss, per cent	4.4	4.9
Hydrogen loss, per cent	6.7	6.7
Radiation and unaccounted for, per cent	1.4	2.4
Total, in per cent	100.0	100.0

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

SHIPPING tonnage under construction in American yards reached a new low level on Jan. 1, according to the bimonthly report released Jan. 11 by the American Bureau of Shipping. Only 266,866 gross tons were under construction at the close of the year as compared with 345,780 gross tons being built a year ago and 303,445 tons as of Nov. 1, 1931, the date of the previous report.

Only two major orders were placed recently in shipyards and they were the 8600-ton coastal car ferries to be constructed by the Sun Shipbuilding & Drydock Co. for the Seatrain Lines Inc. The Matson liner MARIPOSA and the United Fruit Co.'s TALAMANCA were delivered to their owners to remove those vessels from the tonnage formerly listed as under construction.

The greatest tonnage is being built by the New York Shipbuilding Co., followed in order by the Bethlehem Shipbuilding Corp.'s Fore River plant, Sun Shipbuilding & Drydock Co. and the Newport News Shipbuilding & Drydock Co.

Board Authorizes Loan

The shipping board Dec. 22 approved the application of the Waterman Steamship Corp. for loans from the construction loan fund, to be used in the remodeling, improving and equipping the steamers AFOUNDRIA, MAIDEN CREEK, WEST HIKA and TOPA TOPA, a separate loan to be made on each vessel not to exceed three-fourths of the cost and not to exceed $58,545.75 each on the AFOUNDRIA and MAIDEN CREEK, and $54,544.25 each on the WEST HIKA and TOPA TOPA.

These vessels on which the remodeling and improving is proposed are part of the fleet which operates as the Mobile Oceanic line, which was sold by the shipping board to the Waterman Steamship Corp. under sales agreement dated Sept. 14, 1931. The vessels will be required to remain documented under the laws of the United States for a period of 20 years after completion of reconditioning, and must continue in the service of the Mobile Oceanic line.

Contract to Remodel

Contract to remodel and refurnish the steel steamer CHIPPEWA, built at Toledo, O., in 1900, has been awarded to the Lake Washington Shipyards, Seattle, by the Puget Sound Navigation Co. This work is in preparation for the installation of a 2200 horsepower Busch-Sulzer diesel engine, 210 revolutions per minute ordered some time ago. The CHIPPEWA is being adapted for fast passenger and automobile ferry service between Seattle and the Puget Sound navy yard. The new power will develop a speed of 16½ knots.

Receive Bids on Spray Boat

United States engineer office, first New Orleans district, Poland and Dauphine streets, New Orleans, will receive sealed bids, in duplicate, until 3 p.m., Feb. 10, 1932, and then publicly open them for furnishing all labor and materials and performing all work for constructing and delivering one steel, nonpropelled, spray boat.

Submit Low Bids

Low bids for building a double end diesel ferry for Multnomah county officials were submitted early this month by Erickson & Klepp, Rainier, Ore., and the Atlas Imperial Diesel Engine Co. The figures were $6610 and $3896 respectively. Contracts were awarded to these two firms.

Plan Duplicate Motorship

The Harkins Transportation Co., which for years has been an active factor on the Willamette and Columbia rivers, is planning to build a duplicate this year of the steel motorship, L. P. HOSFORD, built and placed in service 1931 between Portland and Astoria. Several months ago the company lost the steamer BEAVER, sunk in collision, and the proposed motorship is to replace the BEAVER. The company has recently been reorganized with Fred H. Marvin, of Tacoma, Wash., as manager.

Awarded Contract

The interior department has awarded the contract for construction of a 55-foot ranger motorboat for the Alaska road commission to J. M. Martinac & Co., 1404 East D street, Tacoma, on a low bid of approximately $12,000, several types of diesel engines being quoted. It was finally decided to install an 80-horsepower Atlas-Imperial diesel engine.

Contract is pending for award by the same department of a sternwheel passenger steamboat, shallow draft, for service on the Yukon river. Seattle and Tacoma builders submitted bids for a new vessel, ranging from $173,176 to $224,608. American Yukon Navigation Co. offered to sell its steamboat KLONDIKE, built in 1928, for $140,000. The KLONDIKE is 210 feet by 42 feet by 6 feet draft, has a 525-horsepower engine and 20 double berth staterooms.

Bids for Reconditioning

Bids for reconditioning the passenger and freight steamship ALAMEDA, damaged by fire at Seattle, were $90,000 in excess of the insurance carried. Consequently the vessel was declared a constructive total loss and will be junked. The lowest tender for rebuilding was submitted by Todd Dry Docks Inc., Seattle, at $590,000. Insurance carried was $500,000, both in American and foreign companies. The hull was purchased by the owners, the Alaska Steamship Co., and what remains undamaged will be salvaged. The ALAMEDA was built at Philadelphia in 1883 and for many years operated out of San Francisco to Australia. Twenty years ago she was purchased by the Alaska Steamship Co. and has since operated successfully on Alaska routes always having been considered lucky, escaping mishap in the treacherous channels of the North. The fire started from an unknown cause while the vessel was lying alongside in her Seattle berth.

Awards by the lighthouse bureau include Baltimore, boilers and fuel oil burning equipment, Maryland Dry Dock Co., $31,997; Chelsea, repairs to tender ANEMONE, Bethlehem Shipbuilding Corp., $7675; Chelsea, repairs to tender SHRUB, Brewer Dry Dock Co., $40,000.

Winton Engine Co., Cleveland, Dec. 29, was awarded contract for two diesel engines, one 15 kilowatt generating set and auxiliary equipment for the army dredge TAYLOR, at $14,140.

Noank Shipyard Inc., Noank, Conn., was awarded the contract for repairs to the steamer ORDNANCE, quartermaster, Governors island, at $9563.70.

Recondition Light Vessel For Texas Coast

The lighthouse tender SUNFLOWER, which acts as supply vessel for lighthouses and lightships along the Texas coast, has been reconditioned and is now ready to return to service, according to the lighthouse service of the department of commerce. The SUNFLOWER, originally built in 1907, has now been converted from a coal burning to an oil burning vessel, a change which will increase her effectiveness as a lighthouse tender.

Work of reconditioning the vessel, which included the renewal of boilers, repairs to the machinery, and the installation of oil burning equipment, was done at the Johnson Iron Works, Dry Dock & Shipbuilding Co., New Orleans, at a cost of approximately $53,000. Trial trips were run on Dec. 15, at which time it was found that the vessel performed in a very satisfactory manner.

Advantages of the reconditioning will be greater steaming radius, a saving of time in taking on fuel, and a possible increase in speed due to the lighter boiler room equipment. The changes in the SUNFLOWER are particularly favorable to the government, for in replacing the worn out boilers the vessel is good for many more years of service, and the new oil burning equipment allows her to purchase the relatively cheap oil fuel used by nearly all vessels on this coast.

Mack Engineering & Supply Co., New York, have been awarded contract for repairs to the army tug GRAND at $2467.20.

At New Orleans, Algiers Iron Works & Dry Dock Co. has the contract for repairs to the dredge GROSSETTE at $2493.70.

Electrical Dredge Equipment

Electrical equipment on a new stern wheel dredge now being built for the United States engineers corps, war department by The Dravo Contracting Co., will be supplied by the Westinghouse Electric and Mfg. Co.

Power generating apparatus and electric drive for the main dredge of the boat includes a 1050 kilowatt turbine generator set, a 1000 horsepower dredge pump motor, switching and control equipment and a five kilowatt turbine generator auxiliary set.

Westinghouse is also supplying motors to drive the following auxiliaries on the craft; jet pump, electric hoist, main circulating pump, forced draft fans and main condensate pump.

Delivery of the electrical equipment will be made early next year. The dredge will operate in the St. Louis district.

Radio Equipment Ordered

Announcement was made on Jan. 16 that orders had been received by the Radiomarine Corporation for the equipment of eight new vessels with radio telegraph and direction finder apparatus. Four of the installations will be on vessels of the United Fruit Co. which are to be launched during the present year. Orders for the same type of equipment have been received for two new vessels of the Eastern Steamship Co. and for the two ships of the Columbian Steamship line which are to be launched at Newport News this year.

The company will also supply the radio equipment for the two ships of the Matson line building at the Fore River plant of the Bethlehem Shipbuilding Corp. This will be the same as that furnished the new steamer MARIPOSA, which is illustrated and described in detail in this issue. The MARIPOSA sailed from New York on her maiden voyage to San Francisco on Jan. 16.

Goodrich cutless bearings are used on the new 50-foot steel diesel tugboat being built for the United States engineers, New York, by Jacobson and Peterson, Inc., Brooklyn.

The boat is equipped with bearings for two 3½-inch shafts.

Naval Bill Calls for Ship Replacement Program

The Vinson bill introduced by Representative Carl Vinson of Georgia is under consideration by the house of representatives naval affairs committee and is intended to authorize the construction of certain naval vessels for replacement and addition. The bill is primarily a replacement program since all but two of the vessels called for are for replacements. A total of 120 ships with a total of 303,190 standard tons are called for, the total estimated cost of which is $616,000,000. The bill proposes laying these ships down over a period of ten years at an annual cost of $61,600,000.

Called for in the bill is the construction of three aircraft carriers, two of about 20,000 tons, one of about 15,200 tons; nine six-inch gun cruisers, one to be of flying deck type of about 10,000 tons; 13 destroyer leaders of about 1850 tons each; 72 destroyers of about 1500 tons each; and 23 submarines. The total tonnage involved is: Aircraft carriers, 55,200 tons; six-inch gun cruisers 90,000 tons; destroyer leaders 24,000 tons; destroyers, 108,000 tons; submarines, 25,990 tons; a total of 303,190 tons.

Brewer Dry Dock Co., Staten Island, has been awarded contract for repairs to the army dredge ATLANTIC at $3582.

Superior Shipbuilding Co., Superior, Wis., will repair the United States Engineer dredge GAILLARD at $4362.18. Marine Iron & Shipbuilding Co., Duluth, will repair the derrick boat COLEMAN, at $2561.20.

Orders received by the General Electric Co. during 1931 amounted to $252,021,496, compared with $341,820,312 for 1930, a decrease of 26 per cent.

Orders for the quarter ended Dec. 31 amounted to $49,321,480, compared with $74,168,480 for the last quarter of 1930, a decrease of 34 per cent.

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Jan. 18, 1932	4.50@5.00	.65	3.25
Dec. 18	4.50@5.00	.65	3.25
Nov. 18	4.50@5.00	.65	3.25
Oct. 18	4.75@5.00	.65	3.25
Sept. 18,	4.75@5.00	.75	3.47½
Aug. 18	4.75@5.00	.75	3.47½
July 18	4.75@5.00	.85	3.72½
June 18	4.85@5.25	.90	3.84½
May 18	4.85@5.25	1.00	4.08
April 18	4.85@5.25	1.10	4.32
Mar. 18, 1931	4.85@5.25	1.10	4.55½

At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Jan. 18, 1932	4.50@5.00	.75	3.45
Dec. 18	4.50@5.00	.75	3.45
Nov. 18	4.50@5.00	.75	3.45
Oct. 18	4.75@5.00	.75	3.45
Sept. 18,	4.75@5.00	.75	3.45
Aug. 18	4.75@5.00	.75	3.45
July 18	4.75@5.00	.85	3.70
June 18	4.85@5.25	.90	3.80
May 18	4.85@5.25	1.00	4.4
Apr 18	4.85@5.25	1.00	4.60
Mar. 18, 1931	4.85@5.25	1.00	4.88

Other Ports

Boston, coal, per ton	$7.50
Boston, oil, f. a. s., per barrel	0.69
Hampton Roads, coal, per ton, f.o.b., piers	$3.85 to $4.00
June 9—Cardiff, coal, per ton	13s 6d
London, coal, per ton	—s —d
Antwerp, coal, per ton	18s 9d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d

World Shipbuilding Volume Is Still on the Decline

WORLD shipbuilding, as the result of a continued shrinkage during the last three months of 1931, is now on a lower basis of production, not only than at any time since the war, but for many years prior to the conflict, says a statement just issued by Lloyd's Register of Shipping, covering returns from all countries save Russia for the quarter ending Dec. 31 last. No returns from Russia have been available for some time.

Following a decrease of nearly 300,000 gross tons in the volume of ships building during the quarter ended Sept. 30 last, there was a further decline of over 125,000 tons in the December quarter.

How the output of the principal groups of shipbuilding countries has compared during the past two quarters is shown in the following table, the figures representing gross tons:

	Dec. 31, 1931	Sept. 30, 1931
Great Britain & Ireland	400,505	417,385
United States	207,837	261,364
Other countries	795,453	852,371
World total	1,403,795	1,531,120

How the new work begun and the tonnage launched have compared during the past two quarters is in the table of gross tons below:

	Dec. 31, 1931	Sept. 30, 1931
New Work		
Great Britain & Ireland	104,364	38,415
Other countries	120,698	133,907
World total	225,062	172,322
Launchings		
Great Britain & Ireland	70,707	78,122
Other countries	230,971	303,535
World total	301,678	381,657

Tanker building comparisons during the last two quarters are shown in the table of gross tons below:

	Dec. 31, 1931	Sept. 30, 1931
Great Britain & Ireland	65,441	122,408
Sweden	83,400	107,450
Germany	72,400	81,590
United States	1,534	9,000
Other countries	128,545	184,810
World total	351,320	505,258

The great bulk of the current world total of 351,000 gross tons is composed of motor tankers; 332,789 tons of this type of vessel being under way, as against 474,978 tons at the end of September.

As the result of a marked decrease in the volume of motor ship construction during the past quarter, coupled with a gain in the volume of other types of merchant shipping, the situation in the September quarter, when more motor vessel tonnage than of all types combined was being built, has been reversed. At the end of the September quarter, motor tonnage represented 50.7 per cent of all shipping being constructed; but during the last quarter the proportion declined to 45 per cent. And while 21,000 gross tons more of motor vessels than of all other types were being built during the September quarter, motorized ships represented over 140,000 tons less than other types in the quarter ending Dec. 31. The contrast is shown in the following table of gross tonnage for the two quarters:

	Dec. 31, 1931	Sept. 30, 1931
Motor vessels	630,083	776,431
Other types	773,712	754,689
World total	1,403,795	1,531,120

Great Britain and Ireland are now devoting only 22 per cent of their current shipbuilding to motor vessels, as compared with about 40 per cent in the September quarter. This change is marked, in comparison with the group of other shipbuilding countries, which report 54 per cent of their construction is motorized tonnage, as against 55 per cent in the previous quarter. Great Britain and Ireland are building 72,000 gross tons less of motor vessels than at the end of September, while for all other countries combined the decline has amounted to 73,000 tons. On the other hand, Great Britain and Ireland are constructing 55,000 gross tons more of other types than in the previous quarter, and the group of other countries is producing 36,000 tons less than in September. How the groups of countries compare in the production of these types of ships is shown in the following tonnage table:

	Great Britain & Ireland	Other Countries
Motor vessels	89,855	540,228
Other types	310,650	463,062
Total	400,505	1,003,290

The contrast in motor ship building between the two quarters is shown in the following tonnage table:

	Dec. 31, 1931	Sept. 30, 1931
Germany	101,656	109,878
Great Britain & Ireland	89,855	162,721
Sweden	89,550	113,950
Italy	77,400	56,800
Holland	67,431	94,981
United States	3,437	13,007

Figures covering all types of marine engines being built or installed throughout the world during the quarter ended Dec. 31 show declines in the output of oil engines and steam turbines, but a gain for reciprocating steam engines.

The total indicated horsepower of oil engines, for all countries, in the last quarter was 513,425 indicated horsepower, as against 618,620 at the end of the September quarter. For Great Britain and Ireland the total declined from 110,680 to 60,947 during the last quarter, and for Italy, from 82,800 to 69,500. Germany's total, however, advanced from 125,435 to 128,743; Sweden's from 61,285 to 63,130, and that of the United States from 6000 to 7225.

For steam turbines during the same period, the total shaft horsepower for all countries combined showed a decrease from 977,880 to 952,060. In Great Britain and Ireland the decrease was from 296,880 to 244,760; for the United States, from 256,500 to 249,900. Italy's figure remained unchanged at 237,000; but France's total advanced from 181,000 to 208,000.

The total indicated horsepower of reciprocating steam engines rose from 107,985 indicated horsepower at the end of the September quarter to 148,180 at the end of December. For Great Britain and Ireland the advance was from 61,595 to 97,021.

The standing of the various countries in tonnage production is shown in the following table, the figures showing the gross tons:

	Dec. 31, 1931	Sept. 30, 1931
Great Britain & Ireland	400,505	417,385
United States	207,837	261,364
Italy	178,287	159,147
France	164,440	169,720
Germany	103,981	113,468
Sweden	95,380	121,080
Holland	67,866	95,216
Spain	55,241	53,889
Japan	53,280	32,620
Denmark	51,800	69,160

There are now only twelve large ships, each of 20,000 gross tons or over, being built throughout the world, as compared with fifteen in the September quarter. Of the dozen now building, Great Britain and Ireland are constructing four, as is Italy; while the United States and France are each building two. At the end of the September quarter, the United States was constructing six such vessels.

P. F. Martin & Co. Inc., Philadelphia, recently acquired the fleet of the Reading Transportation Co. consisting of 55 barges and eight seagoing tugs. This brings the Martin groups up to 63 barges, 10 ocean-going tugs, 15 large harbor tugs and other harbor craft. Captain P. F. Martin, who founded the company 40 years ago, is still its active head.

S.S. Saint John, Express Liner Launched at Newport News

THE new steamship SAINT JOHN the first of two express coastal liners being built at the yard of the Newport News Shipbuilding & Dry Dock Co. for the United States-Canadian service of the Eastern Steamship lines, was launched Jan. 9 amid fitting ceremonies and a distinguished gathering of persons.

As the launching triggers were pulled, Mrs. Robert G. Stone, wife of a director of the lines, cracked on the bow of the $3,500,000 liner a bottle of water from the famous Reversible Falls at Saint John, New Brunswick. On the launching platform she was accompanied by Capt. Eugene O'Donnell, president of the lines, and officials of the Newport News yard. A sister ship, the ACADIA, will soon be launched from the same yard.

Designed by Theodore E. Ferris, well known naval architect, the SAINT JOHN is a vessel of three-deck complete superstructure type, with continuous bridge deck. She has a cruiser stern and a bulbous bow with the stem raked forward, and a complete double bottom. Being an express passenger and freight ship, she has twin screws that will drive her at a speed of 21 knots, about 11,400 maximum shaft horsepower being developed by four Babcock & Wilcox water tube boilers fitted with Todd fuel oil burners; and two sets of single reduction geared compound turbines of the Newport News-Parsons type working under a pressure of 375 pounds and a temperature of 650 degrees Fahr. at the boilers. She can accommodate 745 passengers, 87 of which are in free berth travel, and has 159,000 cubic feet of space available for cargo. From these figures it will be seen that the ship has a remarkably high earning capacity.

All of the deck auxiliaries and most of the engine room auxiliaries are electrically driven, the exceptions being a number of steam driven engine room pumps. Practically all of the galley equipment is electric also; but steam is used throughout the ship for heating purposes. Based on a total of 10,000 shaft horsepower and 28½ inches of vacuum, the fuel consumption rate is expected to be well below .80 lb. of oil per horsepower per hour for all purposes. Electric power for the auxiliaries is provided by three 250 kilowatt, 240 volt steam turbine driven direct current generating sets, supplied by the General Electric Co.

The lines of the hull are fine, the waterline block co-efficient at the service draft of 18 feet (cruiser stern) being .538. An interesting feature is for protection against ice. Doubling plates have been fitted for about 50 feet aft from the stem on 3 strakes at the 17-foot waterline.

Only one grade of passengers will be carried in the 266 rooms which are conveniently arranged.

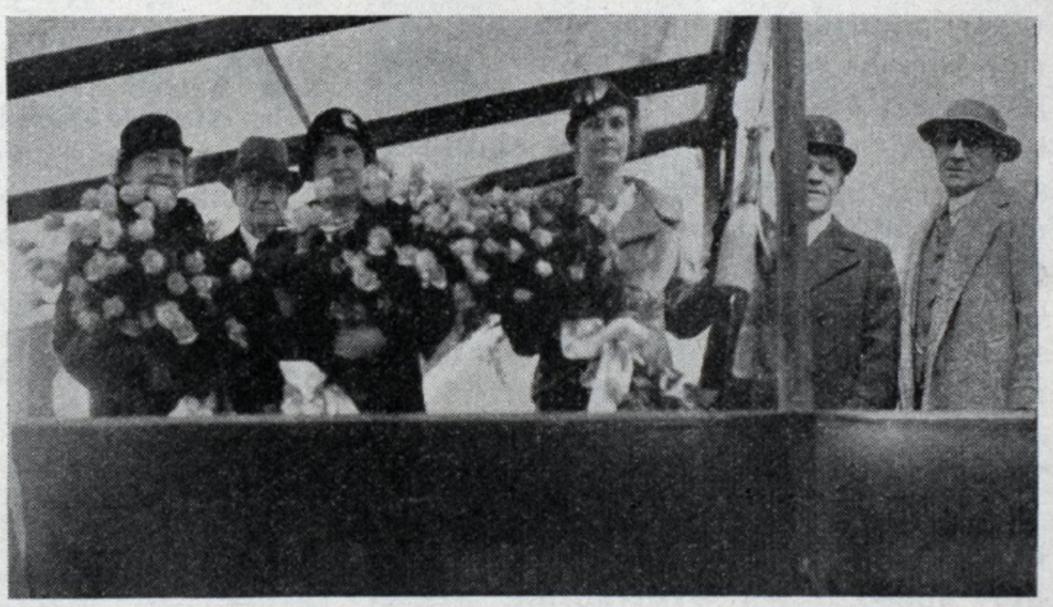
Kearfott all-metal vertical sliding windows are used for the enclosed promenade and in the bridge and promenade deckhouses. As is usual, in all new American ships, the vessel will be rat proofed in accordance with the requirements of the United States public health service. The various stewards' cold storage rooms will contain about 4000 cubic feet to be cooled by the ship's two motor-driven 6-ton Brunswick-Kroeschell ammonia compressors.

For fire protection there are complete Rich fire detecting and Lux fire extinguishing systems, an automatic fire alarm system in each compartment and stateroom, and steam smothering lines for cargo compartment. radio equipment and photophone, complete telephone system for passenger use, ship's intercommunicating systems, mechanical steering gear, a fathometer, and Sperry gyro-compass.

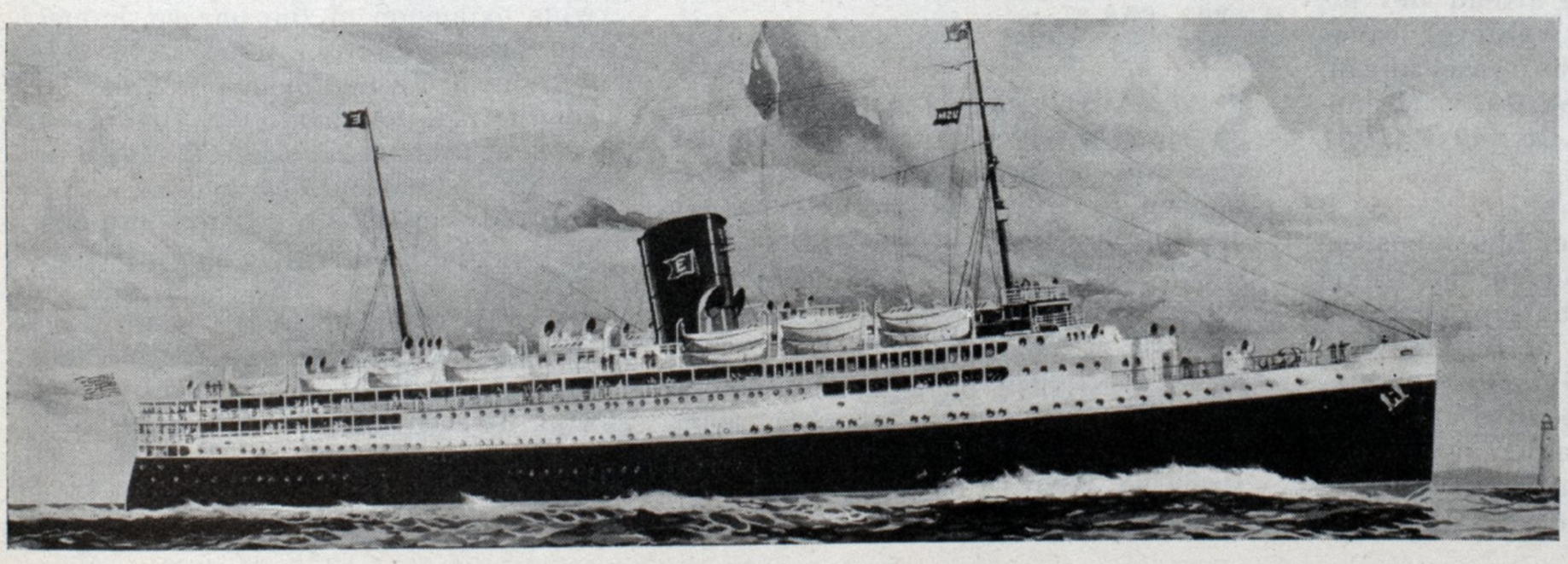
Other special equipment of the most modern type will include an R.C.A. radio direction finder, an automatic steam chime whistle, one 18 inch 30,000,000 beam candle power Sperry searchlight, and two Sperry incandescent searchlights.

Particulars S.S. Saint John

Length, overall, feet, inches	402 9
Length, B.P., feet, inches	387 0
Beam, molded, feet inches	61 0
Depth, molded, feet inches	29 9
Maximum load draft, feet, inches	20 0
Designed service load draft, feet, inches	18 0
Designed S.H.P. at 168 r.p.m.	9500
Service speed, knots	18
Consumption per day, tons, about	60
Displacement at 18 feet, tons	6760
Deadweight capacity on 20 feet, tons, about	2200
Deadweight capacity on 18 feet, tons, about	1200
Gross tonnage, approximately	5500
Net tonnage, approximately	3300
Cargo capacity, cubic feet, about	159,000
Bunker capacity, oil, tons	784
Fresh water capacity	704
Passenger capacity	745
Crew, officers and men	178



At the launching of the S. S. Saint John. Left to right —Mrs. Charles Barnes, Theodore E. Ferris, Mrs. Eugene E. O'Donnell, Mrs. Robert G. Stone, sponsor, Capt. Eugene E. O'Donnell and Homer L. Ferguson



Artist's drawing of the S. S. Saint John built by the Newport News Shipbuilding & Dry Dock Co. for the Eastern Steamship lines and launched Jan. 9. This vessel is the first of two express coastal liners for the United States-Canadian service of the line

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHEN a vessel signals for a starboard to starboard passing, she, in effect merely extends an invitation for an agreement thereto to the other vessel. If the other vessel fails to assent, or if the course of the latter is uncertain, according to the case of Marshall Field & Co., v. United States, 48 F. (2d) 763, the signaling vessel is bound to stop. Even if the distance of the vessels was so great as not to require a reversal of the engine, the situation requires at the least a slackening of speed, until a definite arrangement is consummated.

* * *

ONE who holds himself out as a public wharfinger and invites the public to use his wharf for hire is required to use due care in the protection of the property received by him and is liable for the loss of goods resulting from his negligence. In the case of E. J. Keller Co. v. Reading Co., 49 F. (2d) 33 one question was whether a certain pier owner was a public wharfinger, and, among other things, the court said: "A shipper may not import merchandise, simply dump it down on a private wharf maintained by a common carrier for the storage of import freight in transit destined to some point over its lines, and then make it liable as a bailee for hire for the loss of the merchandise without notifying the owner of the wharf of the presence of the freight, and without making some arrangement for its storage as required by its published tariff."

* * *

THE primary duty of an overtaken vessel, being the preferred vessel, is to maintain her course and keep her speed. An overtaking vessel takes whatever risks attend her attempt to pass from whatever cause arising except from the vessel ahead. —Northern Navigation Co. v. Minnesota Atlantic Transit Co., 49 F. (2d) 203.

* * *

EVEN after a carrier has deposited the goods carried on the wharf at the place of destination, declared the court in the case of Bellingham, 49 F. (2d) 442, his duty to the shipper is not at end. He owes a further duty (as warehouseman) of exercising reasonable care in seeing that the goods come to no harm. Under no other standard could commerce from distant points be carried on.

* * *

CLAUSE in passage ticket exempting shipowner from liability for negligence and clause requiring notice of suit to be given within three days after landing were held invalid in the case of Arabic, 50 F. (2d) 96. In the same case it was held that a frightened passenger, who, when water rushed into her stateroom during a hurricane, went into an adjoining room, was not guilty of contributory negligence nor did she assume the risk, there not having been issued any orders requiring passengers to remain in their rooms. Other passengers, who either started for lifeboats and were injured by a huge wave or who were injured by a big sea while sitting in usual deck chair, or who, while standing in the vessel's vestibule, were injured by wave crashing through the door, were also held not contributorily negligent. "The master," the court said, "is in supreme command of his ship, and should make plain his orders for the safety of passengers and see that they are carried out."

* * *

A SUIT for salvage is barred by two years' limitation prescribed by statute for bringing it unless the court be satisfied that the delay is excusable because of unavailability of the ship for arrest.—Katherine E. Orr, 49 F. (2d) 652.

* * *

THE Merchant Marine Act of 1920, in so far as applicable, supersedes all state legislation, and under such act no right of action survives the death of a seaman by reason of unseaworthiness of a vessel. —Birks v. United Fruit Co., 48 F. (2d) 656.

* * *

SALVAGE awarded should be in a sum sufficient to reward the salvors and to encourage them and other seamen to render prompt service under similar peril in the future.—Atlantic Gulf & West Indies Steamship lines, 49 F. (2d) 263.

* * *

PASSENGERS on steamship whose trunks, stored in baggage room, were damaged by sea water, are entitled to recover for loss unless the damage was occasioned by a cause over which the shipowner and those in charge of the ship had not the slightest control and against which no human foresight could have prevailed; in other words, that what happened was unavoidable by skilled navigation. In the instant case, Empress of France, 49 F. (2d) 291, sudden flooding of the baggage room was directly caused by an unexpected and extraordinarily large wave which boarded the ship doing great damage; this the court held to be an "act of God," defined as some inevitable accident which cannot be prevented by human care, skill or foresight, but results from natural causes, such as lightning, tempests, floods, and inundations. The steamship owners were held not liable for the damage done.

* * *

IT IS a familiar rule that a seaman, taken sick or injured or disabled in the service of the ship, has the right to receive his wages to the end of the voyage, and to be cured at the ship's expense. The point of importance in the statement of the rule, it was declared in Meyer v. Dollar Steamship line, 49 F. (2d) 1002, is in the meaning to be attached to the phrase "in the service of the ship." The peculiar nature of a sailor's occupation calls for a liberal interpretation of this phrase the court said; a sailor cannot, like other workmen, divest himself of all his responsibilities to the company for which he works when his work for the day is done. For that reason, when the courts have been called upon to determine the bearing of the phrase "in the service of the ship" they have given it a wide range. Courts of admiralty have always considered seamen as peculiarly entitled to their protection. One exception is consistently made to a too wide extension of the phrase, namely, the person injured must have acted without gross negligence or gross misconduct on his part. In the instant case a seaman, while off duty and taking recreation, engaged in a good-natured scuffle with a fellow shipmate, in the course of which he received an injury to his leg. The court held that when he commenced his scuffling he created an extraneous circumstance; he brought about an intervening cause that directly affected his relation to his employers and to the ship, and therefore he was not entitled to wages to the end of the voyage.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	314	1,692,258	343	1,744,190
November	304	1,564,284	308	1,542,849
October	309	1,626,094	322	1,708,560
September	523	2,724,761	522	2,641,711
August	541	2,785,703	531	2,739,919
July	538	2,626,814	563	2,754,107
June	541	2,747,134	526	2,596,749
**May	478**	**2,434,601**	**511**	**2,542,351**
April	496	2,538,201	527	2,656,992
March, 1931.....	494	2,396,654	489	2,323,422

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	58	180,172	42	132,734
November	52	148,335	37	111,969
October	69	192,159	57	160,609
September	66	172,313	54	155,113
August	81	208,854	59	147,948
July	76	201,677	59	155,114
June	75	218,611	50	127,906
**May	82**	**235,108**	**62**	**170,497**
April	68	189,113	51	136,433
March, 1931.....	65	198,848	46	116,786

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	102	313,977	65	240,908
November	75	241,142	52	166,786
October	98	325,261	66	241,072
September	109	339,482	78	263,783
August	131	388,799	98	305,488
July	131	362,111	94	290,733
June	130	347,787	97	264,467
**May	108**	**311,171**	**91**	**293,146**
April	107	292,403	89	233,756
March, 1931.....	97	279,797	66	243,377

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	18	38,860	18	37,319
November	17	40,991	19	47,514
October	17	39,060	16	34,195
September	27	48,534	26	52,035
August	29	50,249	23	39,273
July	24	52,979	22	52,945
June	17	28,216	17	26.397
**May	12**	**20,821**	**11**	**22,573**
April	11	30,000	10	25,765
March, 1931.....	6	20,081	7	20,122

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	11	41,268	4	17,037
November	9	35,826	5	18,040
October	6	23,833	6	23,836
September	6	20,330	3	11,160
August	10	41,671	3	12,240
July	6	25,062	7	30,748
June	6	21,104	3	12,211
**May	9**	**37,120**	**2**	**8,674**
April	8	32,848	6	25,101
March, 1931.....	5	18,288	4	17,400

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	29	114,184	40	154,060
November	26	103,835	47	182,585
October	36	144,875	54	207,518
September	32	126,256	49	199,803
August	29	114,582	31	119,968
July	28	107,694	48	174,226
June	30	116,953	35	139,799
**May	24**	**94,695**	**39**	**142,847**
April	26	104,099	36	141,036
March, 1931.....	41	158,869	46	173,220

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	102	330,709	106	354,320
November	99	304,138	98	314,109
October	116	388,308	111	385,136
September	111	350,556	117	362,970
August	122	374,434	118	377,085
July	125	393,553	120	379,526
June	127	376,049	114	338,066
**May	110**	**353,301**	**118**	**368,874**
April	131	409,907	139	420,594
March, 1931.....	123	385,514	107	336,157

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	30	95,762	38	110,614
November	23	77,075	47	113,416
October	25	76,385	54	146,995
September	24	72,333	47	104,255
August	21	59,408	54	127,864
July	31	77,082	63	149,665
June	39	108,710	59	167,488
**May	22**	**63,739**	**49**	**140,356**
April	14	31,959	40	116,565
March, 1931.....	19	47,982	52	137,616

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	12	25,453	10	21,501
November	6	14,295	8	22,180
October	10	25,659	9	17,710
September	6	12,463	8	18,888
August	21	61,439	24	70,922
July	9	18,703	5	9,297
June	11	24,902	13	24,517
**May	8**	**21,046**	**7**	**11,045**
April	15	31,901	5	10,614
March, 1931.....	10	17,299	6	7,839

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	39	68,392	40	73,365
November	40	53,752	42	53,497
October	37	57,588	37	59,408
September	36	54,012	35	55,610
August	37	56,505	37	56,505
July	39	59,268	41	62,526
June	63	81,660	63	86,349
**May	83**	**91,683**	**80**	**90,758**
April	60	55,493	51	54,656
March, 1931.....	60	69,731	56	72,956

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	98	226,656	85	214,395
November	100	214,204	87	189,474
October	118	251,661	112	253,721
September	104	213,204	102	226,192
August	113	217,541	97	194,678
July	101	229,960	92	212,634
June	88	197,952	93	217,151
**May	103**	**194,198**	**93**	**194,198**
April	107	251,402	108	242,685
March, 1931.....	109	232,778	102	229,966

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	50	218,018	48	204,111
November	48	209,655	50	215,614
October	61	257,329	62	267,366
September	52	229,687	50	217,517
August	48	202,879	51	213,091
July	46	207,651	50	222,816
June	52	220,915	52	223,750
**May	43**	**185,945**	**43**	**184,118**
April	50	214.534	48	210.117
March, 1931.....	47	207,105	49	212,237

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	169	482,802	170	504,981
November	173	498,800	169	483,099
October	174	502,867	195	563,095
September	171	474,876	179	508,560
August	179	484,245	172	474,230
July	184	539,810	172	509,475
June	193	561,399	190	562,090
**May	185**	**532,046**	**192**	**551,459**
April	195	576,251	181	536,678
March, 1931.....	185	545,474	188	537,148

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	37	108,083	35	96,490
November	19	31,125	11	35,588
October	20	49,738	22	55,371
September	16	29,428	11	19,111
August	9	18,293	7	6,274
July	13	26,985	10	20,974
June	10	23,571	9	21,074
May	9	16,418	7	11,884
April	17	45,890	19	50,033
March, 1931.....	15	36,938	12	27,110

Galveston

(Exclusive of Domestic)

Month	—Entrances— No ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	37	113,327	111	358,950
November	33	81,906	101	328,883
October	35	80,748	112	354,607
September	27	63,896	99	320,127
August	39	85,793	79	234,583
July	46	107,008	75	226,381
June	35	66,342	73	205,074
**May	27**	**53,091**	**69**	**191,632**
April	26	62,924	68	210,315
March, 1931.....	25	39,536	69	205,341

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	153	517,165	136	506,985
November	147	503,238	142	535,870
October	215	720,162	193	678,776
September	199	580,683	196	593,882
August	199	673,223	204	676,036
July	170	622.694	176	636,440
June	179	659,029	149	568,208
**May	210**	**696,717**	**194**	**731,392**
April	225	644,178	209	626,590
March, 1931.....	224	602,763	210	623,023

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	155	649,915	122	579,608
November	167	688,934	149	614,482
October	167	688,934	149	614,482
September	158	658,088	159	673,120
August	140	636,189	160	665,108
July	173	743,588	155	679,657
June	159	663,047	155	634,838
**May	161**	**658,525**	**163**	**676,789**
April	158	733,902	170	702,433
March, 1931.....	156	642,924	139	544,316

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1931....	26	99,354	42	148,568
November	34	139,899	62	225,833
October	28	126,071	52	194,114
September	34	132,684	45	163,144
August	31	127,112	44	163,103
July	35	148,988	45	178,091
June	23	115,140	38	139,102
**May	23**	**101,100**	**39**	**152,690**
April	32	125.007	47	177,058
March, 1931.....	24	106,838	32	131,470

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 49 of 163,199 net tons entered and 61 of 200,305 net tons cleared for the month of December.

Ships Built on Isherwood System Show Increase

WHILE a substantial proportion of the ships completed during the year 1931 were built on the longitudinal system, only a few vessels were ordered; but if considered in the light of the extremely bad conditions which have existed throughout the year, the number of vessels specified to be built on Isherwood construction is more than might have been anticipated.

The following table, indicating the number and deadweight tonnage of ships built and under construction on this system year by year, will show that the adoption of the system has maintained greater progress, as compared with vessels built on the transverse system than prior to the year 1931.

Ships Built or Under Construction

YEAR	NUMBER	DEADWEIGHT
Sept. 1907 to 1908	6	31,608
1909	36	212,922
1910	76	484,752
1911	140	958,795
1912	240	1,777,348
1913	270	1,993,034
1914	311	2,351,322
1915	468	3,548,221
1916	620	4,666,000
1917	800	6,332,150
1918	1,050	8,707,700
1919	1,260	10,594,700
1920	1,395	11,962,400
1921	1,418	12,032,400
1922	1,431	12,101,890
1923	1,443	12,174,490
1924	1,472	12,408,700
1925	1,502	12,649,730
1926	1,551	13,096,480
1927	1,618	13,491,380
1928	1,653	13,752,920
1929	1,779	14,936,900
1930	1,827	15,357,460
1931	1,858	15,441,600

Two very interesting ships as differentiating from the general type of cargo vessels built or under construction in 1931 are two car ferries for the Seatrain Lines Inc., New York, which are of large size, a special feature of the design being a double skin with close subdivisions to make them unsinkable as far as practicable, to be built by the Sun Shipbuilding & Dry Dock Co. to plans approved by Sir Joseph W. Isherwood & Co. Ltd.

The Sun Shipbuilding & Dry Dock Co. delivered three motor tankers for the Motor Tankship Corp., Philadelphia, the NORTHERN SUN, SOUTHERN SUN, and MERCURY SUN, also one motor tanker, the DAYLIGHT, for the Standard Transportation Co. of New York. These vessels, built on the Isherwood bracketless-system, have a deadweight of 14,600 tons.

The Bethlehem Shipbuilding Corp. also delivered their second tanker for the Sinclair Navigation Co., the HARRY F. SINCLAIR JR., 9300 tons deadweight, built on the bracketless system.

The bracketless system continues to make great progress and has been adopted in 128 vessels aggregating 1,147,000 tons deadweight carrying capacity in the short period of five years since its introduction. The following analysis of the above table of ships built and under construction shows the adaptability of Isherwood construction for vessels of all types and sizes: Oil tankers, 994 aggregating 9,244,000 tons deadweight carrying capacity; passenger liners, general cargo vessels, colliers, ore steamers, Great Lakes freighters, passenger and freight ferry vessels, barges, dredgers, etc., 864 aggregating 6,197,600 tons deadweight carrying capacity.

It is interesting to observe that Sir Joseph W. Isherwood & Co. Ltd have still a fair amount of work in hand, including nine oil tankers of over 16,000 tons deadweight carrying capacity building for the Standard Shipbuilding Co., New York, the structural detail plans of which are being developed by the builders in collaboration with Sir Joseph W. Isherwood & Co. Ltd.

The steel hatchway cover is one of the latest introduction of this firm, and has recently come into prominence. This hatch cover is a simple and effective means of overcoming the enormous risks of fitting wooden hatch covers in cargo ships without departing from the present day method of handling and storing the covers.

The urgent necessity for the universal adoption of steel hatch covers is shown by a letter written to *Fairplay* of Dec. 17, 1931, by Sir Charles Sanders, chairman of the load line committee 1927, 1929, who points out that during the 14 years, 1913/1915 to 1927/1929, some 20 per cent of the foundering of steamers was due to the entrance of water through the hatchways and ventilators.

Owing to the depreciation in foreign exchange, the Sterling subscription rate of MARINE REVIEW has been increased by 20 per cent. The revised rate is £1 4s per year.

Figures made available recently show that during the 14 years since the armistice Germany has made an amazing recovery as a maritime nation. Her merchant fleet, reduced to about 700,000 gross tons by the Versailles treaty, today totals 4,254,000 tons, only 246,000 below the pre-war figure.

Index For 1931

THE index for the year 1931, *covering all the valuable editorial material which appeared in* MARINE REVIEW *last year, is now ready for distribution. Copies will be sent on request, without charge, to those subscribers who have kept a complete file of copies and desire the index.*

Boiler Tests Completed

(*Continued from Page* 35)

controlled by a steel plate baffle. At the sixth tube, the gases flow downwards toward the mud drum, passing across the seventh to the fifteenth rows of boiler tubes. The gases then flow upward past the economizers in a direction counterflow to that of the water in the economizer tubes. Temperature of the exhaust gases averages 300 degrees Fahr.

Characteristics of the new boiler are as follows:

Boiler heating surface, sq. ft.	4910
Economizer heating surface, sq. ft.	3024
Superheating surface, sq. ft.	1955
Total heating surface, sq. ft.	9889
Furnace volume, cubic feet	1100
Maximum designed boiler pressure, lbs.	450
Pressure at superheater outlet, lbs.	400
Steam temperature, degrees Fahr.	750

Equipment used in connection with this installation, aside from that designed and built by the Foster Wheeler Corp., is as follows: Blower, American Blower Co.; valves, Consolidated Ashcroft Hancock Co. Inc.; pumps, DeLaval Steam Turbine Co.; motor and control, General Electric Co.; Renarex carbon dioxide recorder, Permutit Co.; feed control, Swartwout Co.; oil burners, Todd Shipbuilding & Dry Dock Co.; smoke indicators, Wager Furnace Bridgewall Co.; Firebrick and Walls, Dietrich Arch Co.

Our South American Trade

In view of the decline of United States trade with Latin America almost to pre-war level, the committee on inter-American relations and the National Foreign Trade council, composed of representatives of all factors of commerce including finance, transportation and communication, from every part of the United States, are providing for continuing a study of Latin-American commercial, investment and public credits.

The following is quoted from a statement made by Gen. Palmer E. Pierce, Standard Oil Co. of N. J., chairman of the committee on inter-American relations: The purpose is not only to discover what measures leading to improvement may be undertaken now, but also to build up a better understanding in the United States and the countries of Latin America of their mutual interests and relationship tending to guard against future recurrence of such a situation as the present.

The Babcock & Wilcox Co., 85 Liberty street, New York, announced a further consolidation of the resources and facilities of the Babcock & Wilcox and the Fuller Lehigh organizations, effective Jan. 1. The sales offices of the two companies have been combined.

Marine Sales Executive of Vacuum Oil Company

W. L. FAUST, recently appointed assistant general manager of marine sales, worldwide, for the Vacuum Oil Co., Inc., New York, has charge, in that capacity, of all marine sales for the Socony-Vacuum Corp., recently organized as the parent company for the merged Vacuum Oil Co. Inc. and the Standard Oil Co. of New York Inc. Mr. Faust thus becomes one of the leading executives in the worldwide sale of marine lubricating oil. Born at Bryn Mawr, Pa., Mr. Faust completed his preparatory education in Pennsylvania schools and then became associated with his father's firm as a junior public accountant. He entered Stevens Institute of Technology, class of 1918, but the war intervened and in the fall of 1917 he left to enlist in the heavy artillery. Later, having been raised in rank to first lieutenant, he was asked to organize and assisted in conducting a training school for motorized heavy artillery at Fortress Monroe, Va.

W. L. Faust

In the spring of 1919 he secured his discharge from the army and returned to Stevens Institute, graduating in 1921 as a mechanical engineer. He joined the Whitlock Cordage Co., heading the technical department although he later became associated with sales endeavor. During this period a number of patents were granted him on improvements in cordage, one covering the first water resistant rope. In 1929 Mr. Faust left that organization to become manager of domestic marine sales in the marine sales department of the Vacuum Oil Co., New York.

Under the pen name of Walter Livingston he is the author of several detective novels which have enjoyed a wide sale, as well as a play to be seen this spring on Broadway. He also is co-author of a book on ballistics and gunnery, used as a text book during the war. Mr. Faust's offices are at 25 Broadway, and he resides at Summit, N. J.

Joins Lukenweld, Inc.

Henry H. Peck, formerly with the Standard Steel Works Co., of Burnham, Pa., has joined Lukenweld Inc., Coatesville, Pa., as manager of sales. Mr. Peck for many years was associated with iron and steel foundries throughout the country, principally in the sale of castings. Lukenweld Inc. is a division of Lukens Steel Co., and is engaged in the manufacture of arc welded rolled steel parts for all types of machinery and equipment.

Mr. Peck succeeds John S. Bleecker, formerly in charge of sales for Lukenweld Inc., who has been appointed manager of sales research and advertising for Lukens Steel Co. and its divisions, Lukenweld Inc. and By-Products Steel Corp.

R. R. Piper of United Dry Docks, Inc., has been elected vice president of the Propeller Club of the Port of New York to fill the vacancy caused by the resignation of Arthur M. Tode when the latter took office as national president of the Propeller Club of the United States. Mr. Piper has been actively associated with the affairs of the club for several years and his election was approved by unanimous vote.

Merchant Marine Conference Meets in Washington

THE fifth national conference on the merchant marine was held at United States chamber of commerce building, Washington, Jan. 27-28.

Recommendations were submitted to the conference by the national standing committee on the merchant marine, authorized by the conference last year to take such initial steps as may be necessary to carry into effect the various resolutions adopted, and to decide upon the merit of the recommendations contained in the various addresses delivered at the conference.

Many problems of pressing importance to shipping today were taken up at the conference this year including the question as to how best to increase patronage and eliminate unfair competition which militates against the merchant marine.

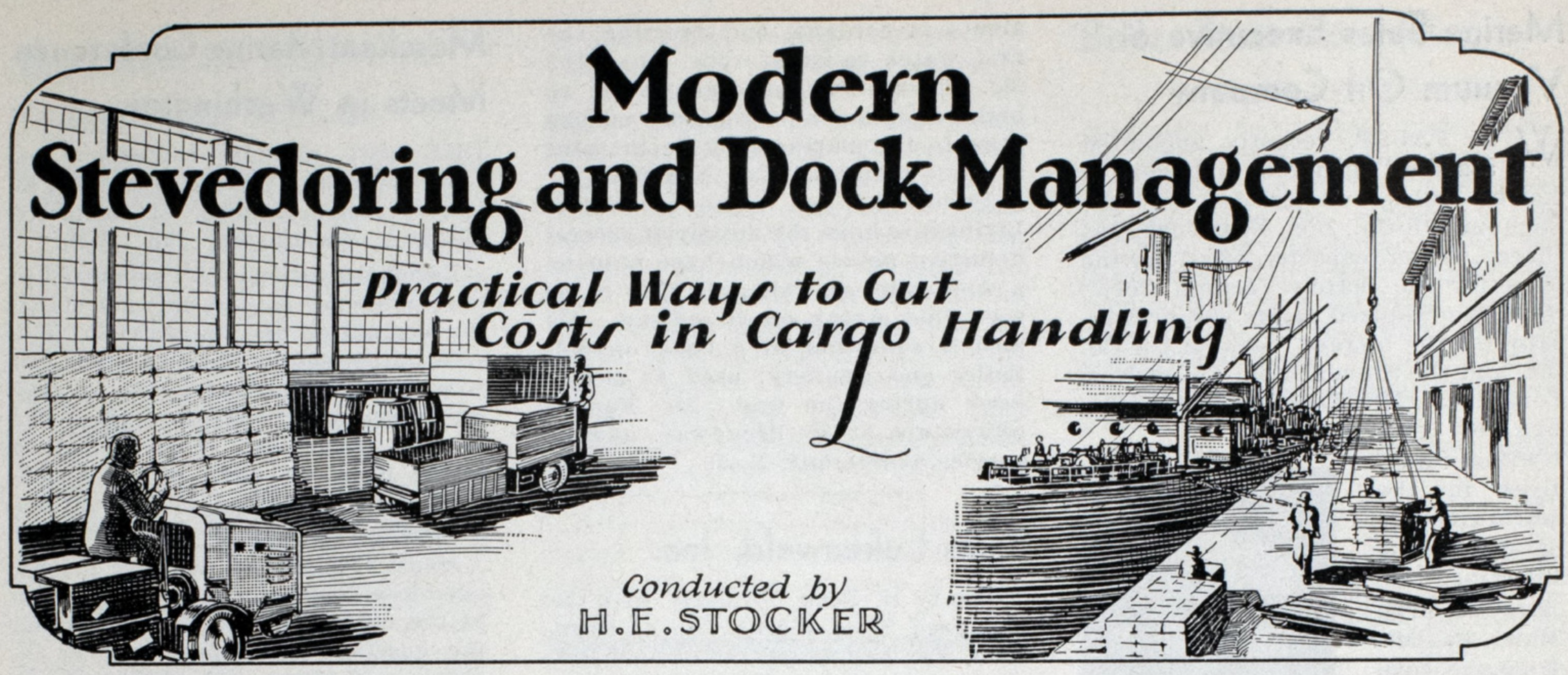
The agenda which it was expected would be finally carried out for the conference includes the following:

1. Report of national standing committee on the merchant marine.
2. Legislative needs of American shipping.
3. Unfair competition as a handicap to the merchant marine.
4. The coastwise and intercoastal situation.
5. Deportation of aliens by American ships.
6. Organized efforts to stimulate patronage.
7. Effect of world depression on American shipping.
8. Problems confronting Pacific coast shipyards.
9. Marine insurance.

Earle Hooker Eaton, United States press representative of the Canadian Pacific railway, retired at the age limit on Dec. 31.

Modern Skipper Uses Autogyro Direct to Steamer

WHEN the steamer WEST IMBODEN docked at the Philadelphia Tidewater Terminals, Philadelphia, recently, her skipper Capt. James O. Story found it necessary to make a hurried trip to Newark, N. J. In order to return to his vessel before sailing time, Capt. Story flew from Newark direct to his ship in Philadelphia in a Kellett autogyro, landing a few steps from the steamer. This direct air transportation represents a new page in the history of travel.



Training Longshoremen in First Aid Increases Factor of Safety

By A. B. Woodward Jr.

IT WOULD be interesting to know the impression which the title of this story creates in various minds. Is it one of doubt, that such a thing has been done? Or wonder as to how it could be done? To those who are really familiar with the accident prevention work in industry, it will surely be a milepost of progress in the recently organized efforts of the marine industry.

About 20 years ago the American Red Cross and the United States bureau of mines began developing simple and practical first-aid courses in which the workmen of any occupation might be trained to properly handle emergencies arising out of industrial accidents. The indifference and open hostility with which the new idea was received by industry in general has disappeared to such a degree that now first-aid training of employes is common, and in many companies universal. In California, the state industrial first-aid contest is an annual tribute to the esteem in which the work is held by the employers who have tried it.

In the marine industry the men who have officer's licenses have learned their first-aid as part of their training. There have always been some of these men connected with stevedoring. Also a few companies have required dock clerks and other employes to have a certain amount of first-aid training. But the thought of extending this training to all longshoremen was considered "impractical and revolutionary" a very short time ago.

With the organization of the accident prevention department of the marine interests in 1927, the possibilities of first-aid training were given consideration. By 1929 the idea had developed so that the Pacific coast marine safety code required a standard first-aid kit at each point of operation and an organization for first-aid training in each major port. Each safety engineer of the department is a qualified first-aid instructor, and he was provided with materials and facilities for holding classes. The department drew up a standard course suitable for longshoremen and prepared a certificate to be issued to men who had completed the course satisfactorily.

The problem then became one of securing attendance at classes. The first classes were held for executives, to demonstrate just what it was intended to each. This resulted in chief stevedores, foremen and "key" men being trained in all the ports. The classes were then opened to all longshoremen.

At San Pedro, the headquarters of Los Angeles harbor, the classes were opened for longshoremen in March, 1930. At first the attendance was low, so that by the end of 1930 there were only 247 certificates issued. As the men and employers realized the value of first-aid training the attendance increased to such an extent that the marine service bureau at San Pedro set aside a room to be used as a class room. The safety engineer held regular classes each morning four days a week. Some of the men have shown keen interest and have returned a second and third time for the work after having received their certificates.

Employment Problem Solved

The problem presented by the irregular character of the employment has been solved by dividing the work to be covered into four parts and giving the same lesson on the same day of the week. After a man has taken the first lesson he may then continue and finish the course that week or take the remaining lessons in following weeks as suits his employment.

Classes, as much as possible, are kept to 20 men or less, though on days of slack work they sometimes tax the capacity of the training quarters. Training of the foremen at the outset has been a large factor in securing the interest of the men. The support of the employers has had a fine influence, but the appeal which

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This article was received from Byron O. Pickard of San Francisco with the notation that it was published in the Dec. 26 issue of the *Shipping Register*, San Francisco. On account of its importance to the industry as an example of what can be done in effective first aid training it is reprinted in MARINE REVIEW. The author, A. B. Woodward Jr. is resident safety engineer, Marine Service bureau, San Pedro, Calif.

first aid, properly presented, has to all workmen, is what has put over the program.

During the month of October, 1931, the 1000 mark was passed in "graduates," with approximately 300 men in training.

The month of October saw the first company reach the record of having trained 100 per cent of its foremen and longshoremen. The Metropolitan Stevedore Co. (see illustration) has the honor of being the first company to complete the training of 100 per cent of its foremen and longeshoremen. Several other companies are approaching that point, and the ambition of the port is to boast that 100 per cent of its registered longshoremen are first aid men. July, 1932, is the time set for this goal, and at the present rate of progress, this should be accomplished.

Results of the work are already coming in. Several injuries have been cared for in an excellent way before sending the man to the doctor. The number of infections has been materially reduced. As yet it is impossible to accurately estimate just what part this training has played in the general reduction of accidents in the port. After studying the injury records of 1004 longshoremen trained in first-aid it was found that 426, or 43 per cent of them, had no injuries reported during a period of 22 months. The remaining 57 per cent received 761 injuries causing no loss of time, and 302 injuries causing loss of time before first-aid training; and 162 injuries causing no loss of time and 125 injuries causing loss of time after first-aid training.

This shows a decrease of 297, or 65 per cent, for the no-lost-time injuries and a decrease of 177, or 58½ per cent, for the lost-time injuries. Due to the difference in exposure before and after training these percentages are not exact, but they tend to prove that a knowledge of first-aid does help to make a longeshoreman more safety-minded.

Storage battery lift trucks operating with skids handled flour from ships side to storage at the rate of 40 to 60 trips an hour, including the placing of the empty skids.

Low Operating Costs of Diesel Tender Linden

Low cost of fuel and lubricating oil for the recently constructed diesel electric lighthouse tender LINDEN is mentioned in a report recently received by the United States lighthouse service, from its superintendent in Philadelphia. The LINDEN, which went into service during the past summer in the Chesapeake bay district, was temporarily assigned to the fourth lighthouse district for the month of October, operating in the Delaware river. Here it was possible to compare her performance with that of the WOODBINE, an oil burning steam vessel.

The report of the superintendent showed that the LINDEN logged 775 miles at a cost for fuel and lubrication of about $180, as compared with 352 miles steamed by the WOODBINE during the same month at a cost for fuel and lubrication of $195. The general efficiency of the new vessel was also reported as high, she being particularly adapted to the handling of buoys. The displacement of the WOODBINE is 107 tons, while that of the LINDEN is 323 tons.

Special Steel Properties

The Electro Metallurgical Co., 30 East Forty-second street, New York city, has developed a special high quality steel suitable for shipbuilding purposes. It is known as Cromansil steel and its general properties were described in some detail in the December issue of MARINE REVIEW in connection with the publication of a discussion by W. J. Priestley, presented before the Society of Naval Architects and Marine Engineers at the annual meeting in New York, Nov. 20.

A recent test obtained on one-inch plate of Cromansil steel in "as rolled" condition gives the following analysis and physical properties: Carbon, 0.26; manganese, 1.10; phosphorus, 0.021; silicon, 0.74; sulphur, 0.035 and chromium, 0.52, all in percentage.

Machined specimens were used, measurements being made with two Huggenberger extensometers with the following results: Proportional limit, 47,500; exact elastic limit, 52,000; yield point, 59,000; ultimate strength, 96,000; (all in pounds per square inch) elongation in two inches, 28 per cent; reduction in area, 62.6 per cent.

When it is consideerd that the test pieces from which these results were obtained were taken just as rolled without any preliminary treatment whatsoever, this steel seems to be a superior quality and will undoubtedly find wide application for shipbuilding purposes as time goes on and as it becomes better known.

Moran Forms New Company

Announcement was made on Jan. 9 of the formation of the Interports Transportation Corp., an organization designed to handle the transportation of coal, granite, fertilizer, stone products and other bulk material between New York harbor and New England ports.

The new company has been formed to take over the business of Bee Line Transportation Co., Boston and New York and will be closely affiliated with Moran Towing & Transportation Co. Inc., New York.

By combining the facilities of the Bee line organization with certain of the equipment of the Moran group, the new company will place at the disposal of its clients a service comprising 85 major units made up of 63 scows, barges and lighters and 22 harbor and coastwise tug boats.

With these augmented facilities the new company plans to materially increase the number of communities served both in New England territory and in New York and New Jersey communities bordering on New York harbor.

It is expected that operations will begin immediately.

The Dampney Co. of America, Hyde Park, Boston, announces that Clarence J. Hunter, formerly Philadelphia district manager and then general sales manager, has been elected vice president and will be in charge of sales.

Longshore employes of Metropolitan Stevedoring Co., Wilmington, Calif. Initial group to receive certificates as "Graduate first aid men" in a program of education in the subject of first aid

Developing Packing Cases for Transatlantic Shipments

By H. E. Stocker

TRANSATLANTIC lines are showing a new interest in fiberboard cases. The conference has been impressed by the work of the Export Fiber Case association which has brought to the shipping industry, packing and shipping research, based on the highest principles and concerned with the broadest vision. Shipping lines have had good reason in the past to penalize fiberboard cases because of the poor quality of the cases, with their consequent inability to withstand the rigors of ocean transportation. Now, however, fiberboard cases are made that can endure the conditions encountered in ocean shipping. The Export Fiber Case association has demonstrated the practicability of fiberboard cases by exhaustive tests extending over one year for each commodity tested.

Ocean Shipping Requirements

Specifications, however high, have meant little to the association. Specifications are not the criterion. The ability to stand the condition of ocean transportation is the real test of quality. Following this idea, the requirements for cases for export shipments of raisins and canned goods have been developed. The requirements of fiberboard cases for other commodities will be determined when, by exhaustive experimentation and testing, a container has been developed that will fulfill all the practical needs.

The tests are directed by the association headquarters in San Francisco, assisted by a staff of service and educational men thoroughly erperienced in the shipping business. This staff works in close co-operation with shipping companies thus obtaining actual facts collected on the best way to handle and stow fiber cases.

Constructive thinkers in the shipping industry realize that anything that can be done to reduce the costs of exporting, is to their interest. Because of this they do not take a narrow, selfish viewpoint, but with intelligent self interest as their motive, they co-operate along sound lines with exporters and fiber case manufacturers to the end that American goods may be the more readily shipped to foreign countries in increasing volume.

An analysis of the amount of competitive canned goods received in England shows that there is a large volume of business to be obtained there provided American prices are right.

Reduced purchasing power due to the depression makes it most important that prices be kept at the lowest practical point. Lower prices are possible for shipments made in fiberboard cases because of the economies in manufacturing and in stowage. However, the prices are not as low as would be possible if the restriction against export shipments in fiberboard cases were removed so that duplication of facilities, by manufacturers making both fiberboard and wooden cases would be unnecessary.

Saving in Space and Weight

In addition to lower prices for shipments in fiberboard containers, further economy is obtained because, having smaller dimensions, they take up less storage space than wooden cases for the same quantity of goods. Fiberboard cases weigh less resulting in saving in handling and other costs. Also fiberboard cases do not splinter nor is there the danger of nails to come loose and injure hands and clothing.

Fiberboard cases can be opened easily for inspection or for relabeling. They can be opened without tools on one side of the labeling set up and passed around to the labeling operator or machine where they are quickly and easily repacked and resealed. The glue sets in sixty to ninety seconds.

An example of good overlapping stowage

Promote Maritime Interests

In the December issue of MARINE REVIEW it was announced that J. Howland Gardner, president of the Society of Naval Architects and Marine Engineers, would appoint a committee to develop ways and means for the promotion of the maritime interests of the United States. The chairman and members of this committee have now been appointed as follows: Lewis Nixon, chairman; James Swan; H. Gerrish Smith; H. B. Walker; J. C. Rohlfs; W. W. Smith; Robert Haig; H. C. Sadler; John E. Burkhardt; E. M. Bull; Robert F. Hand; H. W. Warley; H. H. Brown and Roger Williams.

The committee has before it a difficult task, but by concentrated attention on the problems involved much good is likely to result. The first meeting of the committee was held at the Engineers club, New York city on Jan. 18. Its recommendations will be awaited with much interest.

Civil Service Tests

The United States civil service commission announces open competitive examinations for associate marine engineer and assistant marine engineer.

Applications for these positions must be on file with the U. S. civil service commission at Washington, D. C., not later than Feb. 9, 1932. The examination is to fill vacancies in the departmental and field services. The entrance salary for associate marine engineer is $3200 a year, and for assistant marine engineer is $2600 a year.

Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience.

Full information may be obtained from the secretary of the United States civil service board of examiners at the post office or customhouse in any city or from the United States civil service commission, Washington, D. C.

Lukenweld Inc., division of Lukens Steel Co., of Coatesville, Pa., has appointed two new representatives to handle the sales and service of its products.

In the state of Wisconsin, the Welding Engineering Co., 2872 North Forty-first street, Milwaukee, has been appointed, and in the Buffalo territory Lukenweld Inc. is now represented by Marvine Gorham, Jackson building, Buffalo.

Useful Hints on Cargo Handling

AN INTERESTING example of human engineering is found on the Southern Steamship Co.'s terminal at Philadelphia. Colored labor makes up the bulk of the gangs. Many of the men have been working for the company for 17 years. The men are hard workers and the stevedoring is good both from the standpoint of tons per man hour and the good claim record. Discharging, the tons per man hour average 2.26 and loading, 1.50 tons per man hour is attained.

These good results are obtained to a large degree because of the excellent management of the men. They are looked after in a broad human way that builds loyalty and the will to work well. The agent, Mr. Courtney, is interested in the home conditions of the men and assists them in many ways. Money is given to the men by the company when they meet with reverses. On one occasion one of the men could not afford to bury his child because of the exorbitant bill of the undertaker. When Mr. Courtney heard of this he had a talk with the undertaker and got the bill reduced over two-thirds. The Golden rule is a good business principle. It is too bad more men in business do not apply it.

In manufacturing the more a piece of material is worked on the more valuable it becomes. In materials handling the more a commodity is worked on (handled) the less valuable it becomes, because its cost is increased.

There is nothing that is more distinctive of modern management and nothing that has proved sounder than the principle of creative spending.

THIS page is being devoted to short items on all matters having to do with the more efficient turnaround of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Short Wheel Base Needed

THE Merchants and Miners Transportation Co. uses electric and gasoline tractors on its Philadelphia terminal for handling trailers and miscellaneous work, such as pulling gang planks and towing automobiles out of side ports. Watching the tractors operating on the terminal one is impressed by the importance of having tractors with a short wheel base so they may be easily maneuvered in the congested space found on a terminal.

The Southern Steamship Co. uses a steel gang plank for working cargo through side ports. It is of solid construction and not subject to the splintering that is found when wooden gangplanks are used.

Re-Bo "trays" often cut costs and expedite handling of cargo. In one case four to five cases were handled on a hand truck; when the Re-Bo's were used 20 to 25 cases were handled. One coastwise line has built large "trays" and fitted wheels to them so the "trays" may be moved without a hand truck when necessary.

The Southern Steamship Co. handles four drums of lubricating oil at a time from lighter to ship, using the usual type hook sling. A wooden platform is placed against the ship's side to protect the drums should the slingload hit the side of the ship.

Skids at River Terminal

ALL material going into the warehouse of the Ohio River Terminal & Warehouse Co. at Louisville, Ky., is loaded direct onto skids and then the skids are lifted over into the barge to be unloaded. There are some forty of these skids or platforms in the warehouse, together with two hand lift trucks. The warehouse is 90 by 227 feet and the management has not felt justified as yet in the operation of a power lift truck as the distance to travel is too short.

Sling Trailers Overall

THE practice of slinging caster type trailers overall is growing. When the trailer is the sling, wherever it is landed it is on wheels, ready to go. A regular platform sling often has to be swung to be landed on a truck, with consequent delay. One large line uses 10-foot length of track, made of channel steel, in the hold to run the trailers close to the point of stowage.

A Speedy Turnaround

THE Cunard line reports a fast turnaround by the MAURETANIA. This ship docked at 8:50 p.m. and sailed eight hours later. Eight thousand bags of mail and three hundred tons of cargo were discharged. Five thousand tons of fuel oil in addition to foods and other stores were taken on for a West Indies cruise. Three hundred passengers landed and nine hundred passengers sailed.

One of the illustrations shows the fastest cruiser in the world being hoisted on board the S. S. MUNARGO. The cruiser is 70 feet long and weighs 22 tons. It is owned by Gar Wood.

Lifting 70-foot launch weighing 22 tons from water to deck

Tractor Crane at Montreal retrieving an automobile from a watery grave

Up and Down the Great Lakes

Welland Canal Shipments Gain—Engineer in Charge—Big Decrease in Bulk Cargo—December Lake Levels—Carriers' Schools Begin Sessions—Turning Basin

ACCORDING to figures from the Dominion bureau of statistics, Ottawa, Canada, a considerable gain was registered during 1931 over 1930 in the number of vessels using the Welland canal. A total of 5810 vessels carrying a total of 7,273,886 tons of cargo passed through the canal during 1931, as against 5252 vessels carrying 6,087,910 tons in 1930. Bituminous coal and iron were mainly responsible for this increased movement through the canal. The movement of soft coal amounted to 2,041,940 tons in 1931 as compared with 1,324,539 tons during 1930. The movement of iron ore increased from 49,786 tons in 1930 to 295,592 tons in 1931. The greater part of the coal and ore was delivered to Hamilton and Toronto.

Sultan Placed in Charge

Col. Daniel I. Sultan has been placed in charge of the first United States army engineers' district with headquarters at Chicago. This includes the rivers and waterway projects in Illinois. He succeeds Col. W. C. Weeks, who, upon completing a report on the proposed Calumet harbor development, will report for duty at New York. Colonel Sultan's experience has included two years in the Philippines and four years as a member of the army board of engineers for rivers and harbors.

Carrier Schools in Session

Classes in navigation and marine engineering of the school of the Lake Carriers associa-tion are now in session in Cleveland and Marine City, Mich. Total attendance is 60, which is somewhat below last years enrollment, due no doubt to the present economic situation. In the Cleveland school eleven students are enrolled for original papers in navigation and two for an elevation in grade. In the engineering class, 19 students are seeking original papers and two a raise in grade.

Bulk Cargo Movement Shows Big Decrease

MOVEMENT of bulk cargo on the Great Lakes during 1931 *was the lowest since the season of* 1921. *(See table below). The* 1931 *movement of iron ore, coal, grain, and stone totalled* 74,148,865 *net tons which is a decrease of* 38,379,-992 *net tons compared with the* 1930 *movement when* 112,528,857 *net tons were carried. On account of scarcity of cargoes, especially in the iron ore and grain trades, many operators started only a few of their vessels. Continued depressed conditions in industry resulted in little demand for Lake Superior iron ore, of which only about half as many gross tons were moved in* 1931 *as in* 1930. *The* 1931 *movement of coal was the lowest since* 1926. *The grain movement was the smallest since* 1920. *In the stone trade, the* 1931 *movement was the lowest since* 1921. *Figures for the* 1931 *bulk cargo movement and for ten preceding years are given in the table below.*

For Turning Basin

About 562 acres, comprising the south one-third of Lake Calumet in the Chicago harbor area, has been ceded to the United States government by Chicago as a step in completing the Great Lakes-to-Gulf deep waterway with a large barge harbor and steamship turning base.

The ordinance authorizing the transfer of a part of this habor area to the federal government in return for its share of the development was enacted by the Chicago board of aldermen early in December. This area is in the Calumet section.

December Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of December as follows:

Lakes	Feet above mean sea level
Superior	602.36
Michigan-Huron	578.30
St. Clair	573.45
Erie	570.54
Ontario	243.94

Lake Superior was 0.04 foot lower than in November and 0.02 foot lower than the December stage of a year ago.

Lakes Michigan-Huron were 0.04 foot lower than in November and 1.19 feet lower than the December stage of a year ago.

Lake Erie was 0.21 foot lower than in November and 1.15 feet lower than the December stage of a year ago.

Lake Ontario was 0.06 foot lower than in November and 1.36 feet lower than the December stage of a year ago.

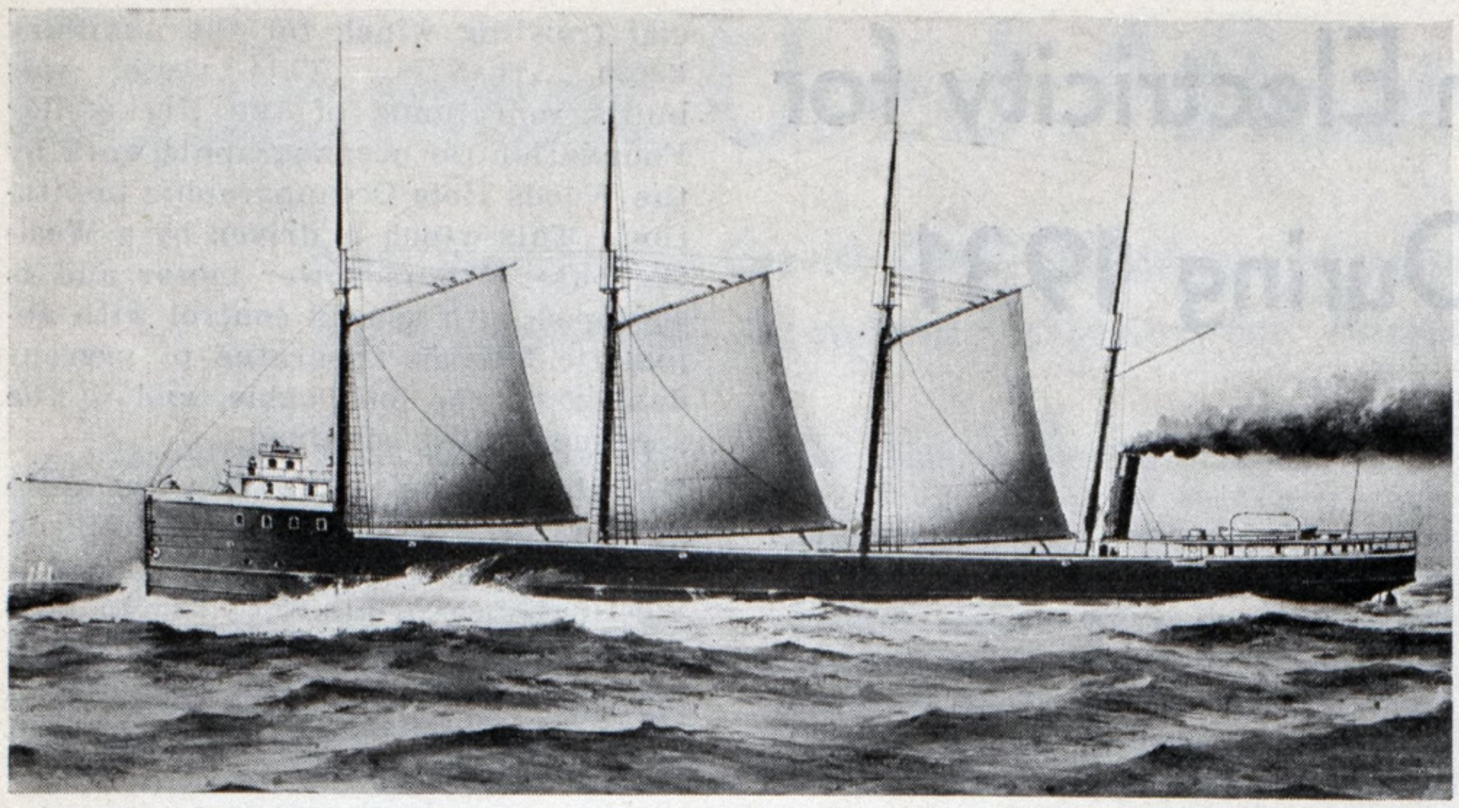
Hold Annual Ball

Announcement by Capt. Theodore Dahlburg, chairman, states that the nineteenth annual ball of Cleveland Lodge No. 4 of the International Shipmasters association will be held Feb. 5 at Hotel Hollenden, Cleveland. Being one of the outstanding events in marine circles during the winter season, it is fully expected by Chairman Dahlburg that many will attend.

Bulk Cargo Movement---1931

Shipments on the Great Lakes for Last Year Compared with Ten Preceding Years

Year	Iron ore Gross tons	Coal net tons	Grain, various kinds net tons	Stone net tons	Total net tons
1931	23,467,786	31,176,359	9,479,640	7,208,946	74,148,865
1930	46,582,982	38,072,060	9,851,229	12,432,628	112,528,857
1929	65,204,600	39,254,578	10,021,099	16,269,612	138,574,441
1928	53,980,874	34,823,002	16,372,116	15,677,551	127,331,248
1927	51,107,136	34,794,291	14,692,536	14,033,376	120,760,195
1926	58,537,855	31,011,544	12,087,316	12,628,244	121,289,502
1925	54,081,298	28,127,359	13,320,346	11,351,948	113,370,707
1924	42,623,572	25,860,515	15,222,787	9,225,624	98,047,327
1923	59,036,704	33,137,028	11,850,446	9,920,422	121,029,004
1922	42,613,726	19,868,925	14,267,020	7,592,137	89,455,455
1921	22,300,726	26,660,652	12,470,405	3,925,705	68,033,575



Photo, Courtesy of Geo. M. Steinbrenner, Cleveland

FORERUNNER OF MODERN STEEL LAKE FREIGHTERS: Steamer ONOKO, *launched 50 years ago. This vessel remained in service 33 years, ten years after ships twice her length and triple her capacity had been developed*

Fiftieth Anniversary of First Iron Hull Lake Freighter

By A. J. Hain,
Associate Editor, Steel

THIS year marks the lapse of a half century since the first iron freighter appeared on the Great Lakes. The vessel ONOKO, found ered in Lake Superior in 1915, after 33 years of profitable service which extended over the period of the most intensive maritime and industrial development.

When the ONOKO was launched in 1882 at the Globe Iron Works, Cleveland, only 20,000,000 gross tons of iron ore had been shipped from Michigan and Minnesota. It was ten years before shipments began from the Mesabi range. Wooden ships, the majority propelled with sails, and loaded and unloaded by means of wheelbarrows, or crude mechanical devices, were struggling with the growing lake traffic. Yet the iron boat survived to the time when the Lake Superior district was disgorging ore at the rate of 50,000,000 tons a year and when a billion tons had been removed.

The ONOKO was the true prototype of the modern steel freighter. It was 302½ feet over all, 39-foot beam, 25-foot depth of hold, with capacity for 3000 tons. It spurred on the invention of newer and faster steel dock equipment. Within four years came the first all-steel vessel.

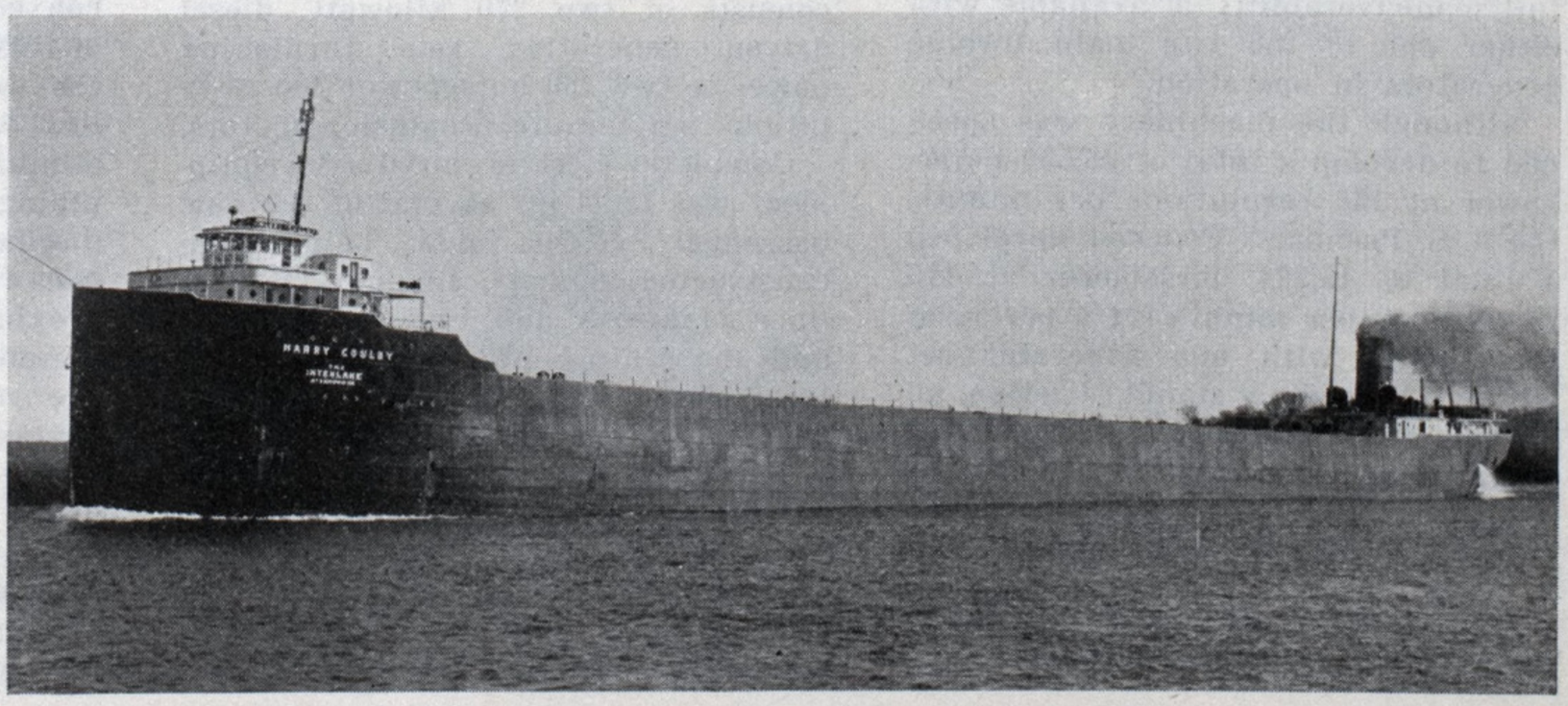
Development of these vessels as regards length and capacity ran a course similar to shipments of iron ore, showing the greatest expansion within 25 years, and then a slower increase. By 1905—that is, 23 years after the ONOKO was launched —steel vessels had been lengthened to 600 feet, with capacity for 10,000 tons. In the same period yearly iron ore shipments advanced from 2,500,000 tons to 34,000,000.

In the past 27 years the length of vessels has been increased only 38 feet. Interlake Steamship Co.'s HARRY COULBY, the largest engaged in carrying iron ore, is 630 feet, 9 inches overall, with capacity for 14,000 tons. In these 27 years ore shipments have mounted from 34,000,000 tons to a recent average of 51,000,000.

In routine loading speed no new record has been set since the steamer D. G. KERR was loaded in 30 minutes with 12,689 tons at Duluth in 1919, though in a special test in 1921 the same ship was loaded with practically the same tonnage in 16½ minutes. In unloading, the fastest time was made at Conneaut, O., in 1929, when 12,000 tons of ore was removed from the steamer HENRY H. ROGERS in two hours, 25 minutes.

To the modern freighter—equipped with engines of less horsepower than the 38-foot international speed boat champion— must be ascribed much of the low cost of iron and steel today. Vessel freight charges from upper lake ports are less than half those 50 years ago. They are approximately one-tenth of the rail freight, mile for mile. The grade of old range bessemer ore which in 1882 sold at $9 to $10 delivered at lower lake port, now is $4.80; nonbessemer being reduced in similar proportion. Gray forge iron, advertised as "made entirely from lake ore" averaged $26.14, Pittsburgh, in 1882. Recently the price has been $16 to $16.50.

A billion and a half tons of ore has been shipped since the ONOKO was launched. Recently a group of Duluth engineers estimated the good grades of ore remaining in Minnesota at 1,300,000,000. In addition, the potential, or possible, reserves in that state were estimated by them at 42,000,000,000 tons—one-fourth the world's potential total. It is evident from these and other estimates that steel lake freighters will be carrying Lake Superior iron ore when the ONOKO is only a faint spark in memory.



Interlake Steamship Co.'s HARRY COULBY, *modern steel freighter with nearly three times the* ONOKO'S *carrying capacity. In 50 years since* ONOKO *was built lake iron ore freight rates and ore prices have been reduced one-half*

Developments in Electricity for Marine Work During 1931

By W. E. Thau

DURING the year 1931 some important developments in marine propelling machinery took place in the United States, the most important of which is the application of turbine electric drive in the two new Dollar line passenger ships, the PRESIDENT COOLIDGE, and her sister ship the PRESIDENT HOOVER. Other outstanding developments represented are the geared turbine propelling equipment in the Ford canal boats, the CHESTER and the EDGEWATER, the geared turbine propelling equipment on the Great Lakes Dredge & Dock Co. tug boat, HARRY B. WILLIAMS, and the gasoline electric propelling equipment on the New York City fireboat, JOHN J. HARVEY.

The PRESIDENT COOLIDGE, built by the Newport News Shipbuilding & Dry Dock Co. for the Dollar Steamship lines, has an overall length of 654 feet 6 inches, a beam of 81 feet, a displacement of 31,000 tons and a designed sea speed of 20 knots. This vessel is driven by Westinghouse twin screw turbine electric machinery designed for 26,500 shaft horsepower.

Each generator is rated at 10,200 kilowatt, 4000 volts, 2660 revolutions per minute, and is of the three-phase, two pole type. The generator and turbine are carried on three bearings and supported by a foundation built into the ship.

The turbines are of the combined impulse reaction type, equipped with a full hydraulic speed control governor so arranged that all speed changes are effected remotely from the control station by means of a hydraulic relay.

With one generator operating both motors, either motor may be operated slightly in either direction, and both motors may be operated together in the same or opposite directions. Thus, full maneuverability is available with either one of the two main turbine generators in operation.

Although the machinery was specified to develop a total of 26,500 horsepower at 134 revolutions per minute, the S. S. PRESIDENT COOLIDGE developed a total of 15,291 horsepower at 113 revolutions per minute for a period of four hours with one generator set without exceeding standardization allowable temperature rises and without abnormal stresses in the machinery.

All auxiliaries except the feed pumps, lubricating oil pumps and some miscellaneous service pumps are electrically driven.

The first gasoline electric fireboat, the JOHN J. HARVEY, built for the City of New York by the Todd Shipyard Corp., was placed in service in 1931. This boat is equipped with five 565 horsepower, 1150 revolutions per minute Sterling gasoline engines and Westinghouse generators. Two of these engines drive 340 kilowatt, 250 volt main generators and 29 kilowatt, 125 volt exciters. Two engines drive two 340 kilowatt generators and the fifth engine drives a double unit generator consisting of two 170 kilowatt, 125 volt generators and a 29 kilowatt exciter. The vessel has twin screws, each driven by a Westinghouse 1065 horsepower, 625 volt, 425 revolutions per minute single unit motor. When going to a fire all five main engines furnish power for propulsion, giving a boat speed of slightly better than 17 miles per hour. When at the fire, the one main engine which drives the double unit generator furnishes power for propulsion, the double generator making it possible to get individual control on the propelling motors with the variable voltage system. The other four main engines are connected to four fire pumps through magnetic clutches.

In the field of diesel electric propulsion, two vessels with this type of drive were completed in 1931 and the equipment for a third is being installed. The first of these was the ferryboat SAN DIEGO, built for service in San Diego harbor. This ferry has three 225 kilowatt diesel generating sets and two 750 horsepower propulsion motors, the vessel being of the double ended type.

Diesel electric drive was used for the power yacht FELICIA. The plant consists of two 270 kilowatt diesel driven generating sets furnishing power to two 330 horsepower 300 revolutions per minute propulsion motors.

Complete electric auxiliary equipment was built for several of the new passenger vessels now being conconstructed, namely, the new Matson liner MARIPOSA and two sister ships, and the United States lines transatlantic liner, MANHATTAN, and her sistership. Each of these ships has four Westinghouse 500 kilowatt, 240/120 volt turbine driven direct current generating sets.

An interesting new development in the auxiliary field was the furnishing of electric equipment for a special trawling winch for the auxiliary ketch ATLANTIS. This vessel was built from funds of the Rockefeller Foundation for oceanographic work by the Woods Hole Oceanographic institution. This winch is driven by a Westinghouse 70 horsepower motor and is equipped with special control with automatic tension apparatus to prevent damage to the long cable, and to the specimen being obtained.

An interesting installation was made on a diesel ferryboat for the Wilson line. This installation consisted of a Westinghouse 20 kilowatt, 535 to 1435 revolutions per minute, 125-volt auxiliary generator which was belt driven from the direct connected diesel propelling engine shaft.

In the marine turbine field some ingenious developments have taken place in 1931: Multiple overhung wheel turbine drive, the 100 per cent astern power turbine drive, water box circulating pump and the lipless scoop circulator.

The drive installed on the Ford canal boats CHESTER and EDGEWATER utilizes the Westinghouse multiple overhung wheel turbine arrangement. These vessels are twin screw type having a total horsepower of 1600. The turbines drive through double reduction gears having two high speed pinions. There are four turbine casings to each gear. Each casing contains a single impulse wheel. Three wheels are used for ahead operation and one for astern operation.

Another development of similar design is found in the Great Lakes Dredge & Dock Co.'s tugboat HARRY B. WILLIAMS. In this case also there are four Westinghouse turbine casings containing single wheels overhung on the pinions. Two wheels are used for ahead operation and two for astern operation. Thus the full 850 horsepower is available in each direction.

A similar arrangement of machinery is used to drive the dredge pump on the dredge SINALOA owned and operated by the Leatham Smith Dock Co.

A very important development of the year is the Westinghouse lipless scoop and vertical, submerged, divergent discharge for condenser circulation. A quarter size model was built and tested on the destroyer WELBORNE C. WOOD. The chief advantages of this type of scoop as compared with the conventional type of scoop are less weight, less space and practical elimination of injection and discharge piping. Except for a slight lip on the discharge, projections are eliminated, thus reducing the drag on the ship approximately 50 per cent.

Another installation of interest is the repowering of the propelling plants in the battleships PENNSYLVANIA and ARIZONA. The high pressure, direct drive, inboard turbines were removed and geared units substituted. New Westinghouse geared cruising turbines were installed on the outboard shafts.

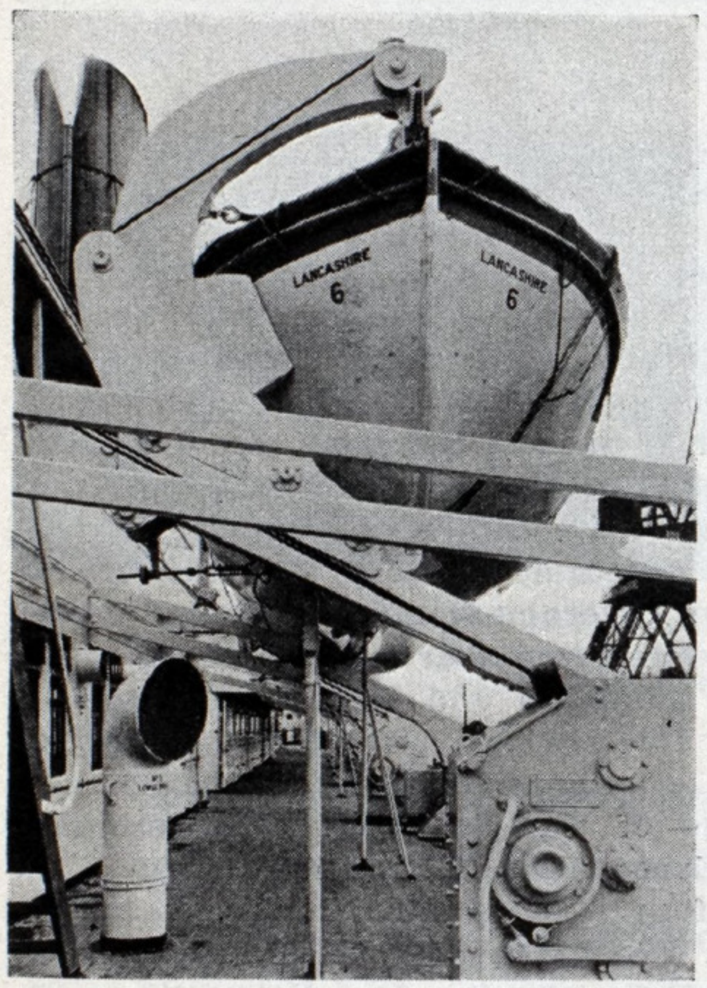
The author, W. E. Thau, is director of marine engineering, Westinghouse Electric & Mfg. Co.

Equipment Used Afloat and Ashore

New Type English Gravity Davit—Regulators of Improved Type Developed for Oxygen and Acetylene — Device for Priming Centrifugal Pumps

A GRAVITY davit of simple construction designed for the efficient launching of lifeboats by the releasing of a brake is being marketed by Samuel Taylor & Sons (Brierley Hill) Ltd., Brierley Hill, Staffordshire, England. An installation of this device is shown in the accompanying illustration.

The gear consists of two pairs of plain trackways on which a carriage runs, the carriage in turn supporting an arm which carries the boat. The path of the rope is such that inboard it retains the arm in the carriage, and the carriage in the upper or inboard position on the trackways. The gripe gear also automatically retains the davit and boat inboard and the gripes must be tripped before the boat can be lowered. When outboard the carriage gradually comes to rest without shock or jar and the pull on the rope is almost constant in all positions.



Taylor Gravity Davit on Bibby Liner Lancashire

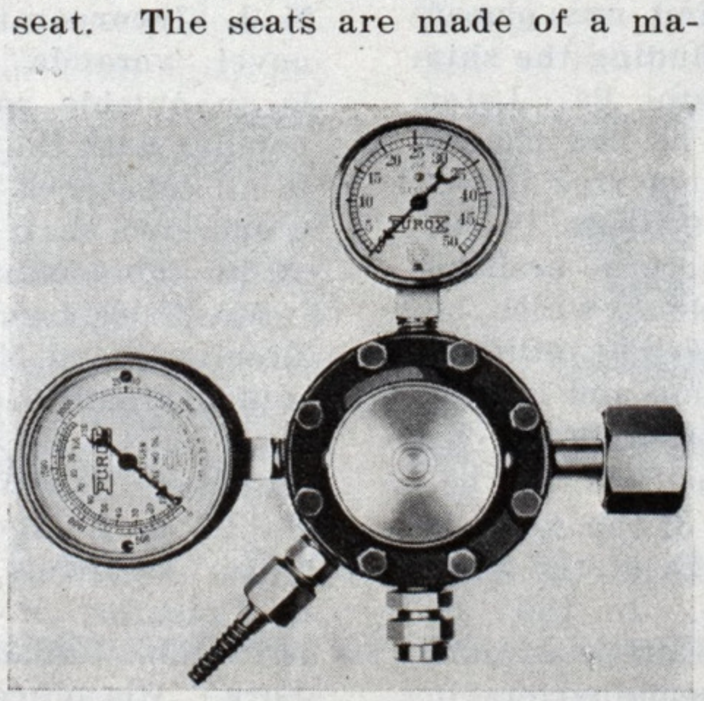
Among the advantages claimed for the Taylor gravity davit are the following: Simplicity of design with plain tracks easy for the shipbuilder to erect and free from complications; perfect arrangement of track wheels in which the load is distributed over three sets of wheels at each end of the boat without overhung pins; impossibility of twist in trackways owing to load being exactly over the center of gravity of trackway channels; lateral rigidity of whole structure due to wide, well-stiffened trackways; a gravity davit arranged so that carriage slows up at the end of its travel without decreasing the speed at which the boat is being put outboard, and so avoiding shock when the outboard position is reached; the whole davit constructed from wrought mild steel, no steel castings whatever being used.

In designing a winch to work in conjunction with the gravity davit, strength has been attained by making all gears, shafts, frame plates, casing, etc., of mild steel, the only cast material being the rope drums and bearing shells. Machine cut spur gears and pinions are used throughout and all gears and parts are enclosed in a steel casing.

Design New Regulators

AN ENTIRE series of new and improved oxygen and acetylene regulators was recently introduced by the Linde Air Products Co., New York. This new Purox series comprises six regulators, Nos. 33 and 34 for acetylene and Nos. 13, 14, 23 and 24 for oxygen, all regulators having the same general external appearance. They are of all-metal construction, simple, compact, rugged and workmanlike in appearance and thoroughly reliable in performance.

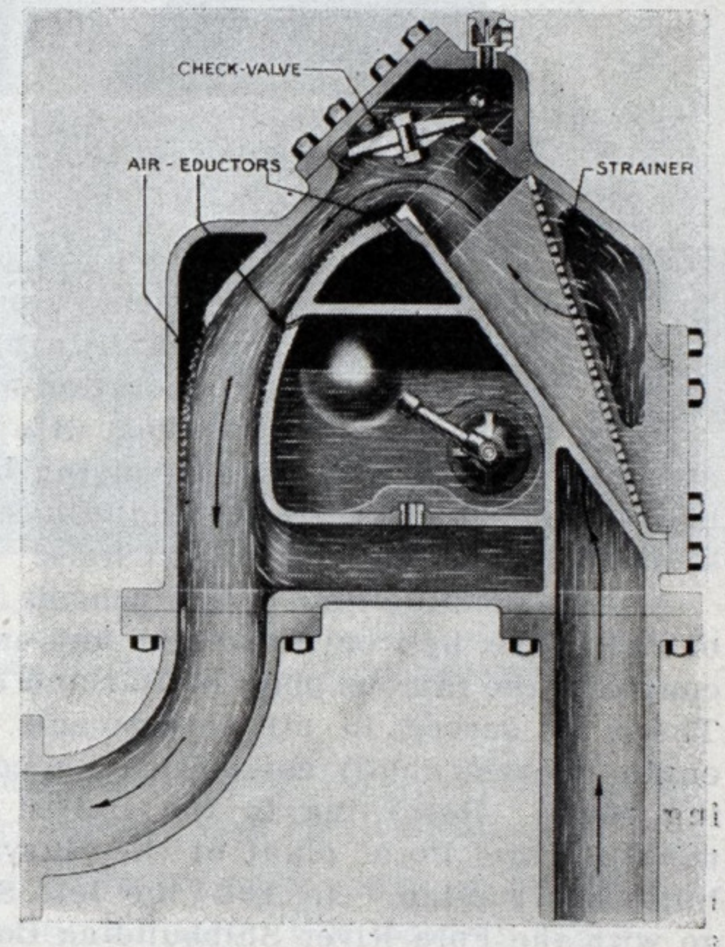
One of the outstanding design features of the new regulators is an accurate self-aligning valve of the nozzle and yoke type, insuring sensitive action and freedom from leakage. Simplicity of construction also eliminates any need of disturbing the diaphragm, bonnet, pressure adjusting screw, or pressure adjusting spring when replacing a worn valve seat. The seats are made of a material not easily damaged and the diaphragms are made of a special corrosion-resisting alloy, assuring long life. Gages for the new regulators are heavy and well made to withstand rough usage. The cases are polished brass with beveled plate glass crystals. The working pressure gages are 2 inches and the cylinder pressure gages 2½ inches in diameter.



Purox No. 14 Oxygen Welding Regulator

Suction Line Primer

A NEW priming device for centrifugal pumps has been announced by Barrett, Haentjens & Co., Hazleton, Pa.



Hazelton Suction Line Primer for Centrifugal Pumps

The device combines in one compact casting a check valve, strainer and air removing device. It is built in various sizes, for a maximum capacity of 1500 gallons per minute and a maximum operating head of 200 feet. When furnished with a special control panel, it makes possible automatic operation of the pump with complete protection against loss of water, air leaks, break of the column line, and other important details.

The suction line primer does not reduce the efficiency of the pump to which it is attached. The air-pump action of the primer functions only while air is present in the suction line. When the air has been removed this action stops although the pump continues to operate.

Personal Sketches of Marine Men

H. E. Frick, Vice President and General Manager, The Export Steamship Corp.

By E. C. Kreutzberg

Photo by Kaiden-Keystone Studios

AS GENERAL manager of one of the largest overseas American flag services he is unusually well equipped in practical and technical knowledge.

HE HAD the benefit of early training in shipbuilding followed by years' of experience in responsible positions in leading American shipyards.

A KEEN student of operating costs, his command of incontrovertible facts, logically presented, helped greatly in the promulgation of effective marine legislation.

H. E. FRICK, vice president and general manager of The Export Steamship Corp., 25 Broadway, New York, is a well-known figure among those identified with the operation of deep-water ships under the American flag. He has charge of that company's fleet of 28 vessels, plying between North Atlantic and Mediterranean and Black Sea ports, and known as the American Export lines.

After attending the public schools in his native city of Baltimore, he went to Ireland and enrolled in a special course at the famous plant of Harland & Wolff in Belfast. There he served in all departments of the yard and engine works, finally completing his course in the drafting room. Returning to the United States, he joined the Sparrows Point plant of the Maryland Steel Co., on hull construction. In 1904 he left Sparrows Point to go with the Fore River Shipbuilding Co. at Quincy, Mass., where he served in various capacities, remaining after the yard had been acquired by the Bethlehem Shipbuilding Corp. He was in charge of hull construction when, in 1917, he left to go with the United States shipping board.

With the Shipping Board Mr. Frick first was placed in charge of all the board's activities, including the ship construction and housing program, at Bristol, Pa. Later he was transferred to Hog Island where he had charge of ship construction. In 1919 he was transferred to the Pacific coast, as manager in charge of the North Pacific district, with headquarters at Seattle. Here he assisted in the settlement of many difficult problems which he inherited as district manager. In 1920 he returned East and was made manager of construction and in that capacity was placed in charge of all construction.

Resigning from the shipping board in 1921, he became vice president and general manager of the Atlantic Corp., Portsmouth, N. H., and took charge of the completion of a shipbuilding contract there. In 1922 he again joined the shipping baord, going to Europe as manager of maintenance and repairs with headquarters in London. There for three years he was identified with the reorganization of the maintenance and repair staff in European ports. In 1924, he resigned to join The Export Steamship Corp. as operating manager, later becoming vice president and general manager. This company purchased first 18 vessels and later six additional. During the years 1929-30 The Export Steamship Corp. also operated 14 chartered vessels in the Russian service.

In 1926, Mr. Frick became active in directing attention to the need for government aid for private vessel operators and he wrote several articles on ocean mails which were widely published and highly influential in shaping thought on this subject. The movement which he started resulted eventually in the Jones-White act.

After the passage of this act, Henry Herbermann, president of The Export Steamship Corp. pledged his company to build four steamers under the provisions of this act. To Mr. Frick was assigned the responsibility for constructing these vessels. In collaboration with George G. Sharp, naval architect, New York, and the operating staff of The Export Steamship Corp., EXCALIBUR and her sisterships were designed, and the vessels built at the plant of the New York Shipbuilding Co., Camden, N. J. Incorporated in these new vessels was Mr. Sharp's novel "veranda" arrangement by which each stateroom is an outside room. These vessels have proved most popular with the travelling public and reflect great credit to all concerned in their design and construction. With a specified shaft horsepower of 8000, a speed in excess of 18 knots is attained in service.

Mr. Frick has been a member of the Society of Naval Architects and Marine Engineers since 1902 and a member of the Institution of Naval Architects of Great Britain since 1904. He is a member of the American Bureau of Shipping, New York, and of the advisory board of the U.S.P. & I. Agency Inc., New York. He resides at Upper Montclair, N. J., with his wife and family. He is a member of the Upper Montclair Country club, the Art club, Philadelphia, and the Whitehall club, New York. His office is at the headquarters of The Export Steamship Corp., 25 Broadway, New York.

Mariposa, Matson Liner

(*Continued from Page* 26)

pilasters. Corridor walls and ceilings are generally finished in pale French gray, and floors are covered with blue and light gray rubber tile. Stateroom doors in corridors are given a coat of dull silver, and door frames are painted pale blue. Foyers are similarly finished in grayish green with gray and green rubber tile floors. The staterooms are finished, in most cases, with cool grayish green, with touches of bright coloring in the rattan chairs and the shades for the bed and dresser lights. The specially designed dressers are painted green to harmonize with the walls, and are decorated by dainty painted garlands of small flowers. Beds are of metal, of the appearance of bamboo, and were designed especially for the ship.

Furniture in the four special suites de luxe is, to some extent of the Chinese Chippendale style.

The first-class lounge is a room of unusual beauty and attractiveness. It is about 50 feet square and 15 feet high. The decoration is a rather broad adaptation of Chinese Chippendale, with mural decorations from floor to ceiling consisting of quaint oriental figures and foliage in the style of Pillement, painted in soft coral tones on a background grading smoothly from golden yellow at the bottom to deep turquoise blue at the top. The windows are screened with carved wood grilles, which are finished in antiqued gold leaf. All windows and doors have canopies of carved wood in gold and turquoise color, with valences of Philippine "Kapa" shell—a translucent, faintly colored sea shell.

The lighting is derived from four large indirect fixtures arranged on four slender, clustered columns in the room. These fixtures are in the form of inverted flaring bells of "Kapa" shell and gilded bronze.

The furniture is principally rattan, with gray colored binding and deep, comfortable cushions in shades of blue, green, and gold. A large table in the center is flanked on each side by a sofa, and carries a lamp in the form of a tall Chinese vase with large silk shade. The floor is covered with rubber tile in a basket pattern of soft blue and green. The curtain for the stage is made of shimmering, silver-green transparent fabric over a backing of gold satin and blends perfectly with the general decorative scheme of the room.

The writing room is decorated with charts and mural paintings depicting the Pacific ocean and the ports of call from San Francisco to Australia. The charts are in old parchment color and the murals in soft pastel shades. The panel moldings framing the murals, the low wood dado, and the cornice and ceiling are all painted soft old ivory color. Desks are painted a soft dull yellow; the chairs revolve on fixed bases, and are painted to match the desks, having upholstered seats of green, coral, and silver brocade. Each desk has a desk lamp of rock crystal in Chinese pattern; and flat, crystal ceiling fixtures light the main body of the room. Windows are screened with wood grilles in Sheraton design.

The library is finished in knotty pine, both walls and ceiling, in early American style. Wood grilles are fitted at the windows and continue the effect of wainscotted walls. Book cases are fitted from floor to ceiling at each end of the room. On the wall on the long side of the room are hung rare old prints of ships of the eighteenth and nineteenth centuries. Drum tables are used in this room, and deep, comfortable arm chairs upholstered in blue morocco. The floor is of deep blue rubber tile, with a thick pile blue carpet runner extending the length of the room. A glass cornice extends entirely around the room, concealing lights, and giving a soft, pleasant illumination.

In the smoking room, the walls are wainscotted from floor to ceiling in chestnut stained grayish, with the grain clearly showing. The ceiling is divided into panels by shallow beams of chestnut, and is painted grayish blue. In the center of the room is a well in the ceiling, the sides of which are decorated with panels of undersea life in misty tones, somewhat in the Japanese style. Gray oak is used for the furniture. Table chairs have cane seats and backs, and arm chairs are upholstered in blue leather. The floor is of pinkish gray rubber tile harmonzing with the walls. Carved wood grilles are fitted at the windows. The walls are decorated with a number of rare prints of old English hunting scenes.

Off the smoking room is the men's club room, for men only, as its name implies. It is finished in Oregon cedar toned down to a soft reddish brown with the natural grain of the wood showing. In one corner is located the bar, behind which is featured a carved illuminated panel showing Neptune and a mermaid drinking toasts to each other, while angel fish, sea horses, and a sea serpent look on. The furniture is similar to that in the smoking room, and carved wood grilles are provided at the windows.

A dance pavilion completes the list of public rooms on A deck, and is a combination of veranda and cafe and night club. The room is decorated in the manner of a palm court or covered garden. The walls are of a pale green material of the appearance of stone or marble, and are overlaid with wooden lattice work. Trim is in green, gold, and Chinese red. Living palm trees are used in the decorative scheme. Windows aft and on each side afford light, plenty of fresh air in warm weather, and a fine sea view, and large doors open on a deck aft which forms a quiet open veranda. The center of the room is clear of furniture, and an excellent maple floor furnishes dancing space. Outside the dance floor, small tables are placed; and the floor is covered with rubber tile which simulates Travertine marble.

The foyers on A deck are furnished with handsome rugs, appropriate furniture of Chippendale design in ebony with champagne colored leather upholstery, console tables, mirrors, and paintings. One of the paintings is the work of the famous marine artist M. Dawson, and depicts a brig in full sail on a rough, sunny sea.

The first-class dining saloon is finished in dull silver, relieved by delicate moldings in green. Each wall panel is decorated by a gay bird in bright plumage, and all together form a border of brilliant color around the room. Windows are of leaded "Kapa" shell illuminated artificially from behind and the light from them is soft and iridescent. The center of the room is a full additional deck in height; the walls of this form a marine panorama with ships of all kinds from early Viking types to clipper ships, including a variety of South Sea sailing craft. Slender pillars add to the apparent height and divide the mural into panels. Illumination is by indirect flood lights. Dining room chairs are made of aluminum, and are finished in dull green with plain upholstery of the same color. The floor is of rubber tile in varying shades of green, and the ceiling is soft coral pink in diamond shaped panels, with small lights set close to the ceiling and protected by shades of crystal in a pineapple pattern spreading light without glare.

The interior decoration and furnishing of the MARIPOSA is a distinct departure from the conventional style for steamships. Period rooms are entirely lacking, and heavy hardwood finish has given way to painted walls; and draperies and window curtains to wooden grilles in the public rooms.

In the cabin-class accommodations, the staterooms, foyers, and corridors are decorated in a manner very similar to corresponding first-class spaces. Coolness, comfort, and simplicity are the keynotes of the decorative schemes.

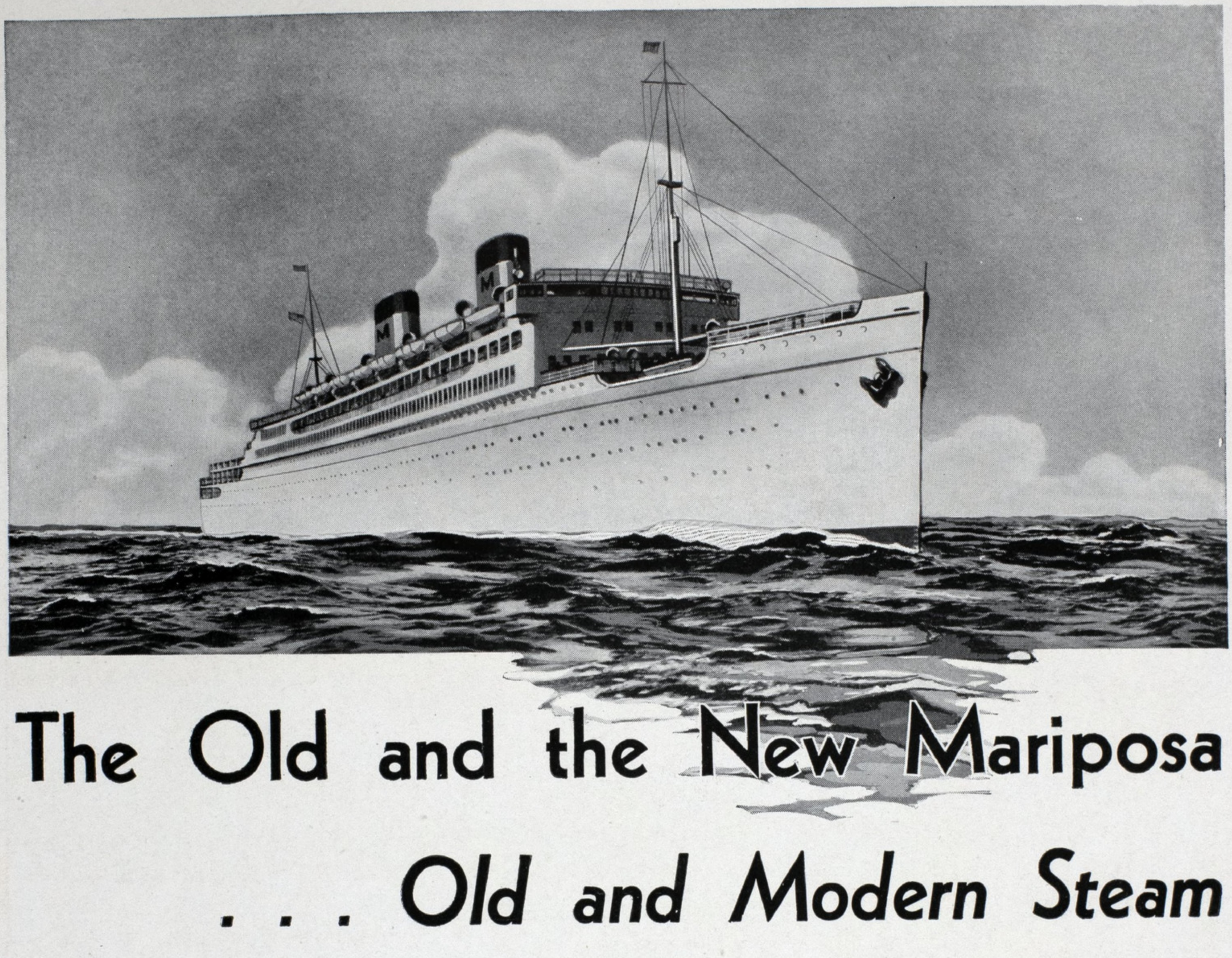
In the cabin-class, the style of decoration is more conventional, but wicker and light appearing furniture is still retained to a large extent, and the upholstery provides the bright color necessary to relieve the plain paint generally used on the walls. Gay tapestry curtains are used in the windows here. The paint on the walls in staterooms and public spaces is generally ivory and dull green. Fancy decorations are omitted in favor of refined simplicity.

Marine Review

Reg. U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

February, 1932



The Old and the New Mariposa

... Old and Modern Steam

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Marine Products

Water Tube Boilers
Superheaters
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TWENTY-NINE years ago the *Mariposa,* single screw iron steamer of the Oceanic Steamship Company, cleared San Francisco for Tahiti under steam at an average pressure of 165 pounds from oil fired cylindrical boilers . . . marking the initiation of oil burners in trans-Pacific service. Sails were set to take advantage of the trade winds.

The new *Mariposa* and the two other super-liners of the Matson Line will enter service between California, Hawaii, New Zealand, and Australia with Modern Steam at 400 pounds pressure and 650 degrees fahrenheit total temperature . . . securing a fuel rate of less than half that of the old *Mariposa* and indicating the true economy of steam at higher pressures and temperatures.

The *Mariposa, Monterey* and *Lurline* will be equipped with Babcock & Wilcox Water Tube Boilers, Superheaters, Air Heaters, Desuperheaters, Feed Water Regulators, Oil Burners, and furnaces lined with B. & W. No. 80 Firebrick. This equipment with its background of three decades of specialized engineering experience typifies the progress made in the development of machinery for Modern Steam propulsion.

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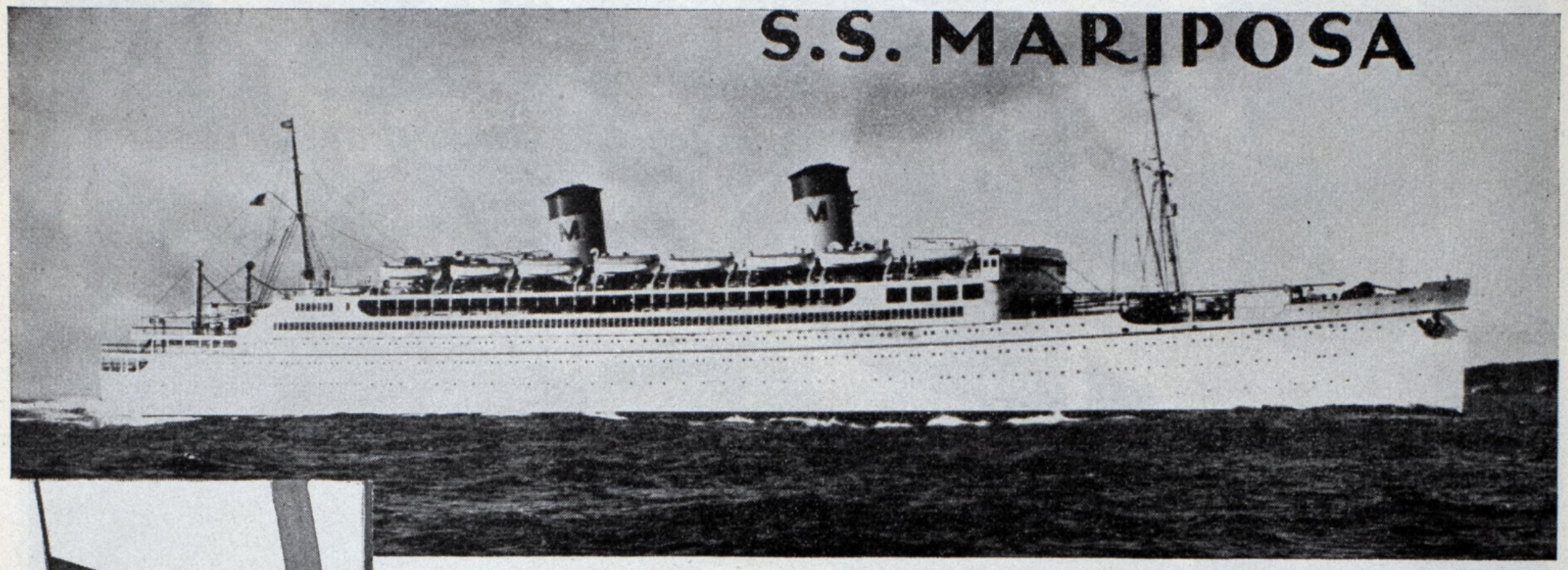
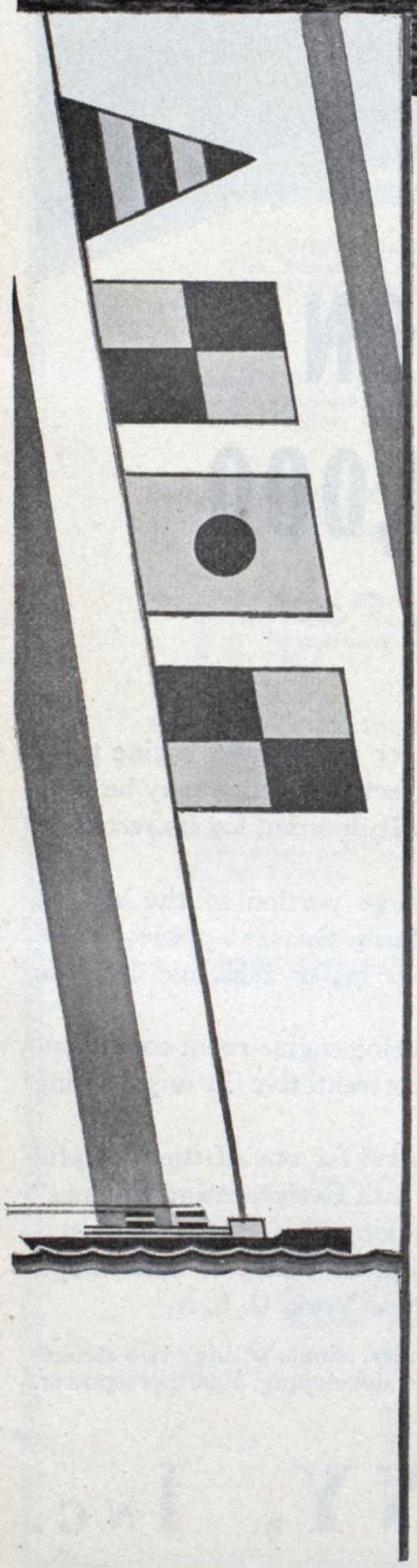
85 LIBERTY ST. NEW YORK, N.Y.

Vol. 62, No. 2, Feb.. 1932, issue of MARINE REVIEW, published monthly at Cleveland, O. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3.00 a year in U. S.; Canada, $4.00; Great Britain, £1; single copies, 35c.

A NEW SOVEREIGN OF THE PACIFIC

S.S. MARIPOSA





— *100% equipped with Westinghouse Auxiliary Motor Drive*

ON January 16th, a new sovereign of the Pacific and the new flagship of the famous Matson Line, the S.S. Mariposa, sailed from New York on her 30,000-mile coronation tour via Havana, Panama Canal, California, the South Seas and the Orient. She is a nine deck super-liner over 600 feet in length with accommodations for nearly 800 passengers.

The electric power requirements of this modern addition to America's merchant fleet are supplied by four Westinghouse turbine-generator sets which produce a total of 2000 kw. Westinghouse motors and control also power the deck and underdeck auxiliaries, assuring economical and dependable service with the quietness of operation demanded today of all modern passenger ships.

In her modern galley, Westinghouse electric ranges and bake ovens will make possible the finest cuisine with the utmost economy. And in her spacious public rooms, staterooms and crew's quarters more than 200 Westinghouse marine type fans add to the comfort of the passengers and crew.

The selection of electrically driven deck and underdeck auxiliaries by the Matson Line for the Mariposa and her sister-ships, the Monterey and Lurline, is another confirmation of the ever-growing preference of progressive steamship owners and operators for electrically driven auxiliary machinery.

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COST *this motorship** $50,000

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For nine years this was considered a necessary evil. Those nine years cost $50,400—an average of $1400 per trip or $5600 a year. *And that was merely the cost of re-metalling bearings.* It did not include labor, loss of time or the loss of good-will caused by innumerable delays in transit.

Finally the owners decided that something must be done.

A Vacuum Oil Company engineer was called in. He made a coastwise trip on the vessel. Then he submitted his recommendations. They included the proper grade of Gargoyle D.T.E. Oil—*a grade made to fit the specific work to be done.*

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Performance records in a large portion of the world's tonnage prove that Gargoyle Marine Oils save power, reduce fuel and oil consumption, lower repair bills and increase engine life.

If you are interested in reducing engine-room costs, consult the Vacuum representative in any leading port.

In the meantime send for one of these helpful books: "Steamships with Reciprocating Engines" or "Marine Lubrication—Motorships." Address Vacuum Oil Company, Inc., Marine Sales Dept. D-2, 61 Broadway, New York, U. S. A.

*Driven by six-cylinder, single-acting, two-stroke-cycle Diesel engines developing 3000 horsepower.

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Electro-Hydraulic Steerers
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Among new boats for which A-E-CO Auxiliaries have been chosen are such outstanding vessels as the Morro Castle, Oriente, Mariposa, Monterey, Lurline, President Coolidge, President Hoover, Florida, Manhattan and a whole fleet of tankers, tugs and other craft.

A-E-CO Auxiliaries are made in every type . . . steam, electric and electro-hydraulic . . . for steam vessels or motorships. Our 75 years of experience in designing marine equipment is just one of the plus values you get when you buy A-E-CO Auxiliaries.

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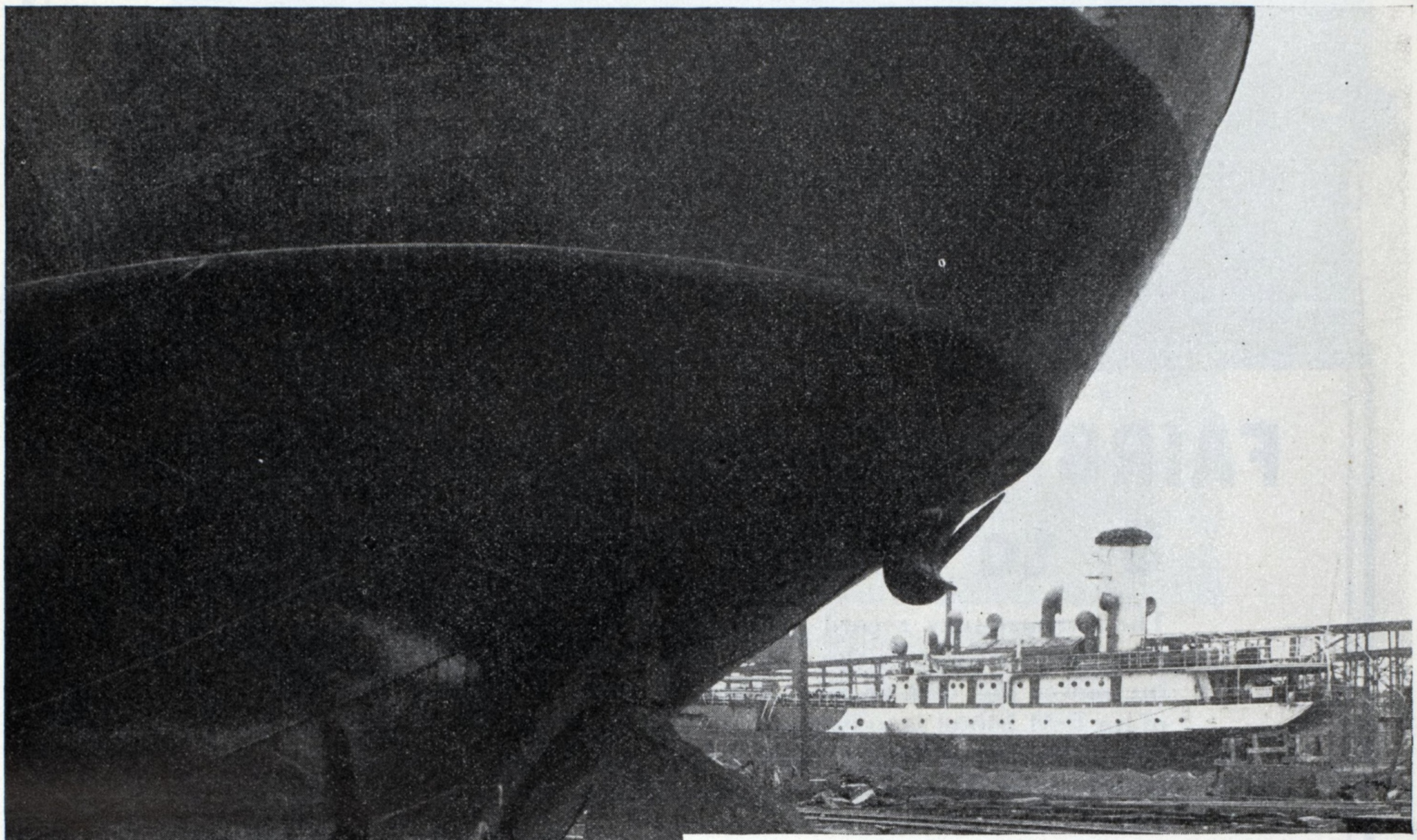

WE want to call to your attention the fact that many ships which you plan to operate in 1932 may need new tank tops, need boilers overhauled or replaced, need many other jobs done which you have been postponing for better times.

Probably you have also put off making certain changes, improvements in your ships which would enable them to serve you better.

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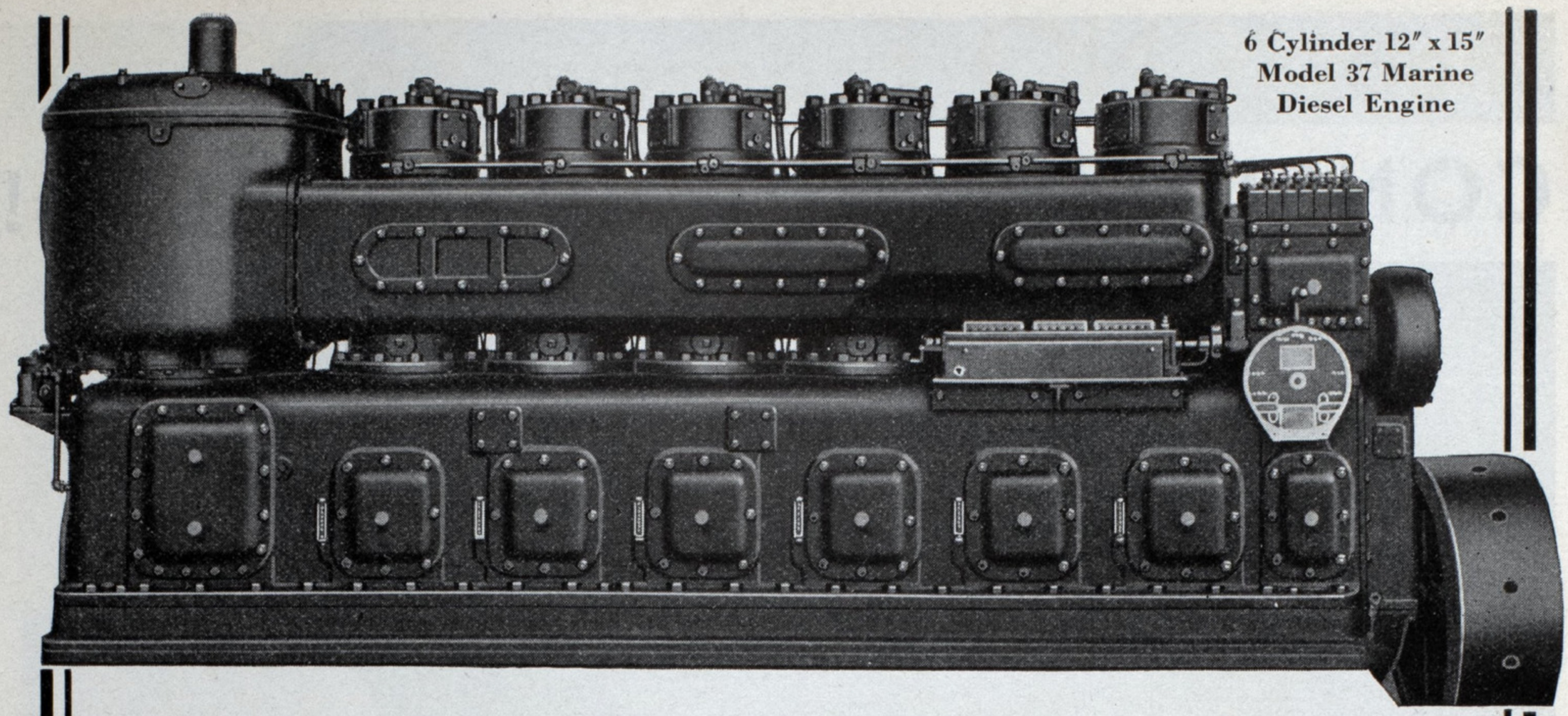

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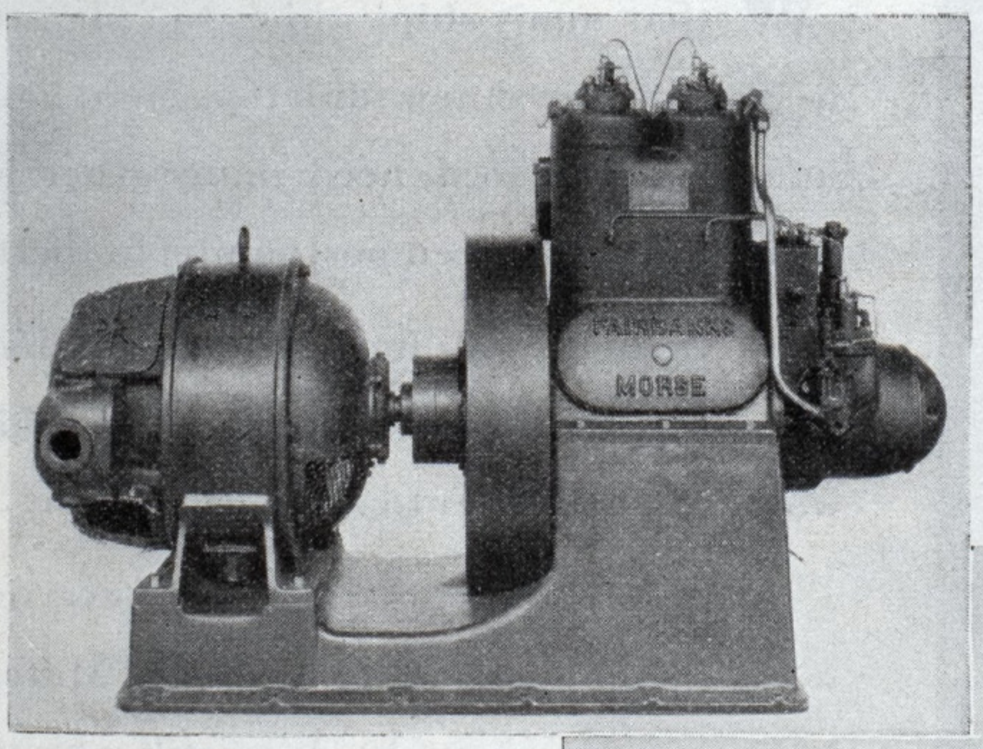

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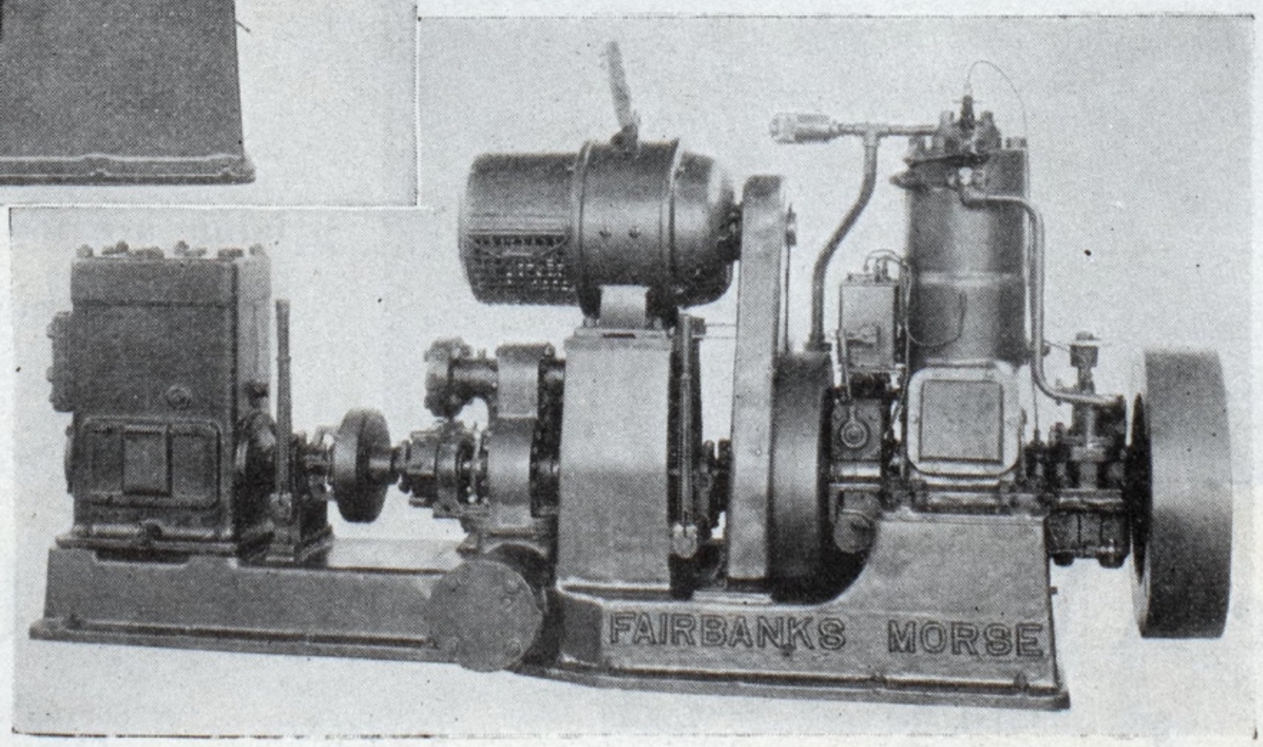

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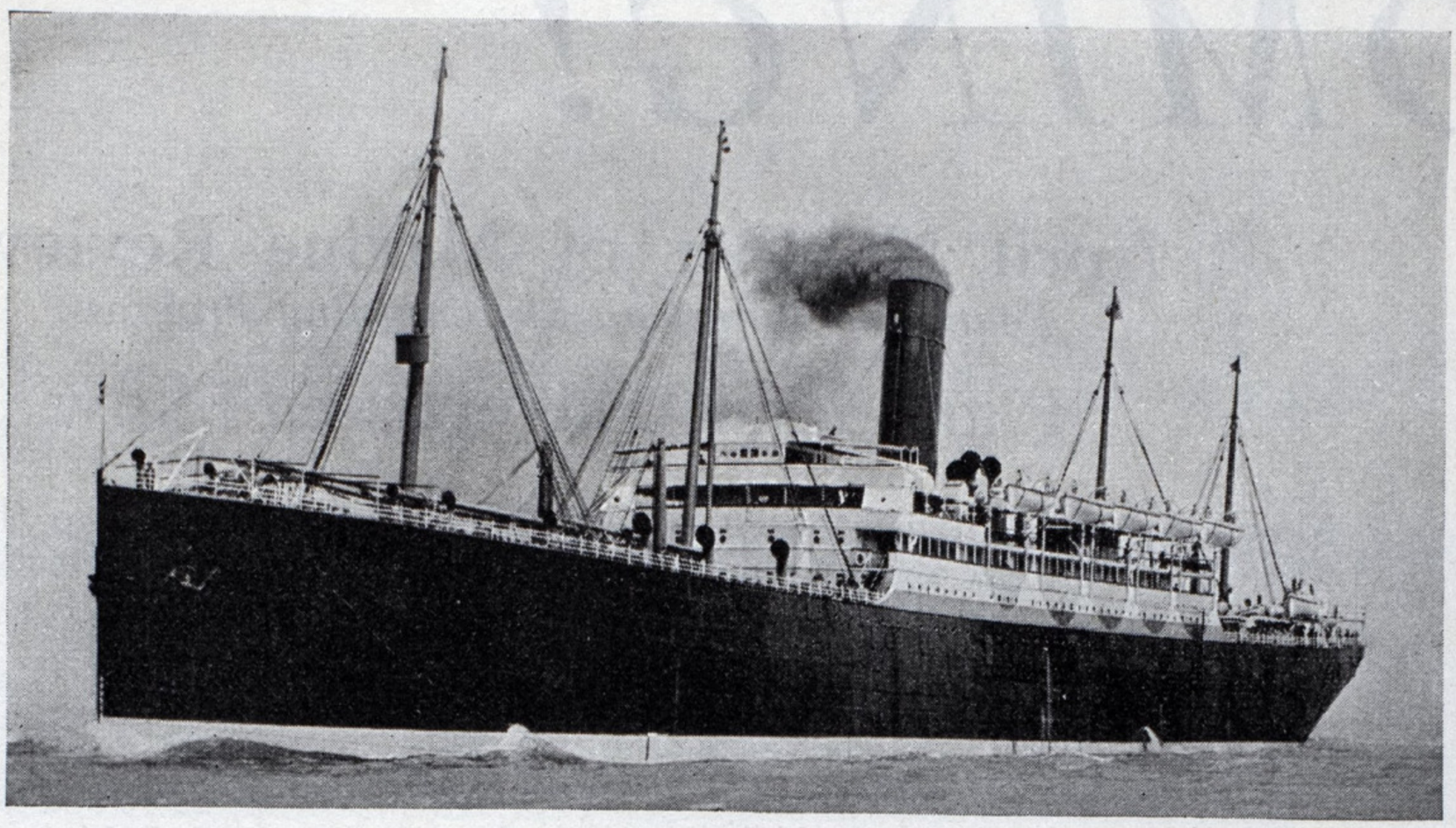

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"The Distinctive Ship issue is most interesting and valuable to every one interested in American shipping and especially as a reference for those directly connected with shipbuilding."

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Marine Review

220 Broadway
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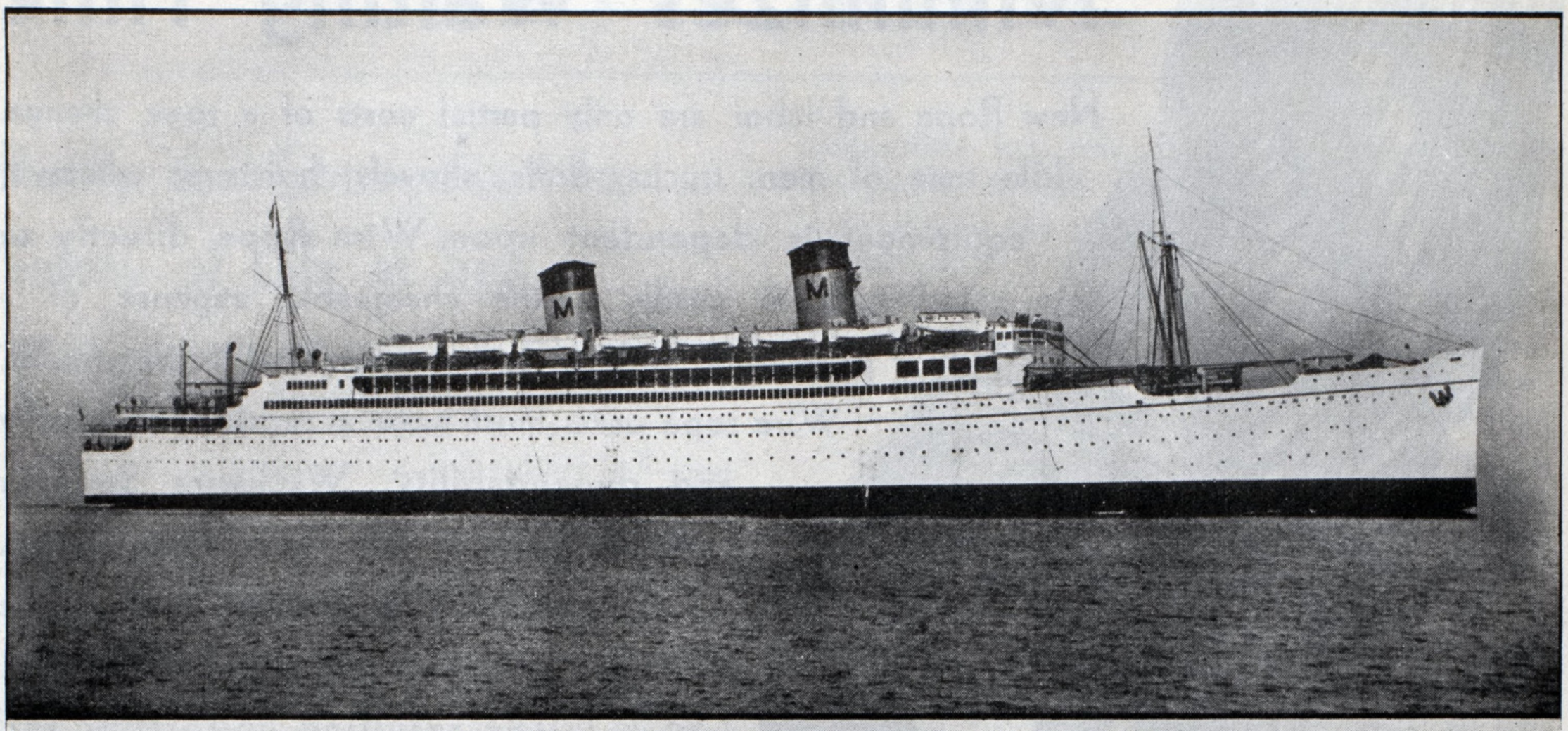
Penton Building
Cleveland, Ohio

THE NEW ★ QUEEN OF THE PACIFIC

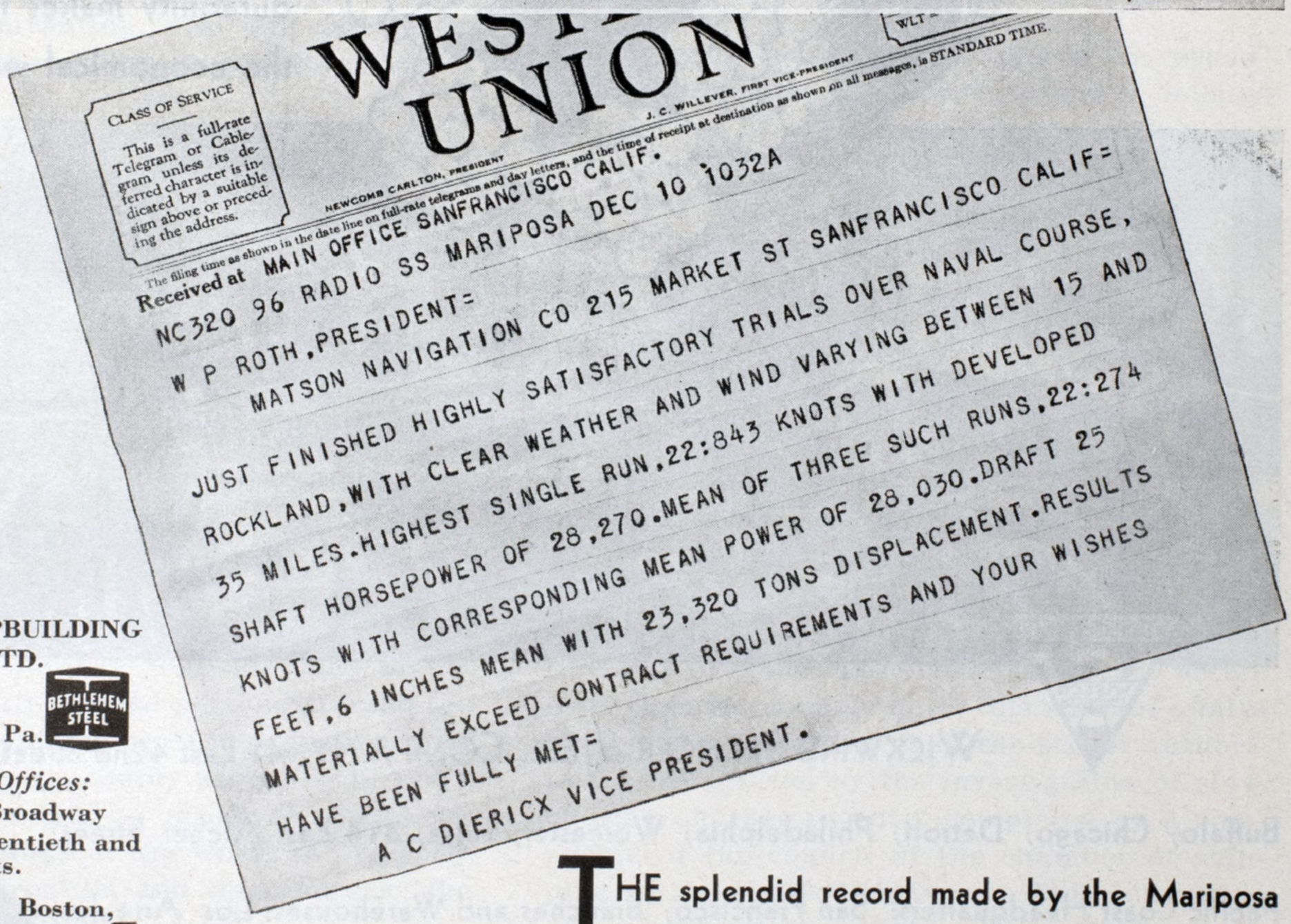


★ S. S. MARIPOSA OF THE MATSON NAVIGATION COMPANY

Built at Bethlehem's Fore River Plant and delivered to her owners for service between San Francisco and the Antipodes

★

Length overall . 631'6"
Beam . . . . 79'
Passengers
1st Class . 500
Cabin . . 250
Machinery . Twin Screw
Bethlehem Geared
Turbines



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A C DIERICX VICE PRESIDENT.

THE splendid record made by the Mariposa on her trial trip is a source of pride to the entire Bethlehem organization.

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General Offices:
Bethlehem, Pa.

BETHLEHEM STEEL

General Sales Offices:
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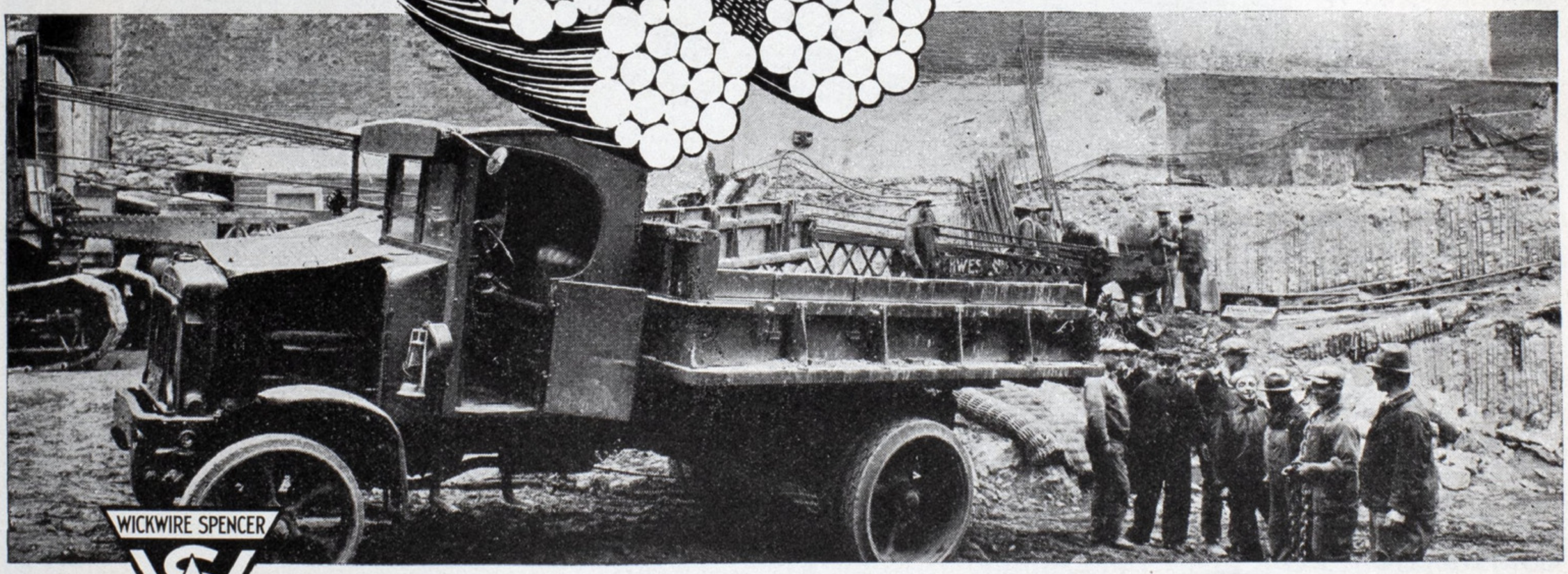
BETHLEHEM

Quality Wire Rope Minimizes Waiting Time

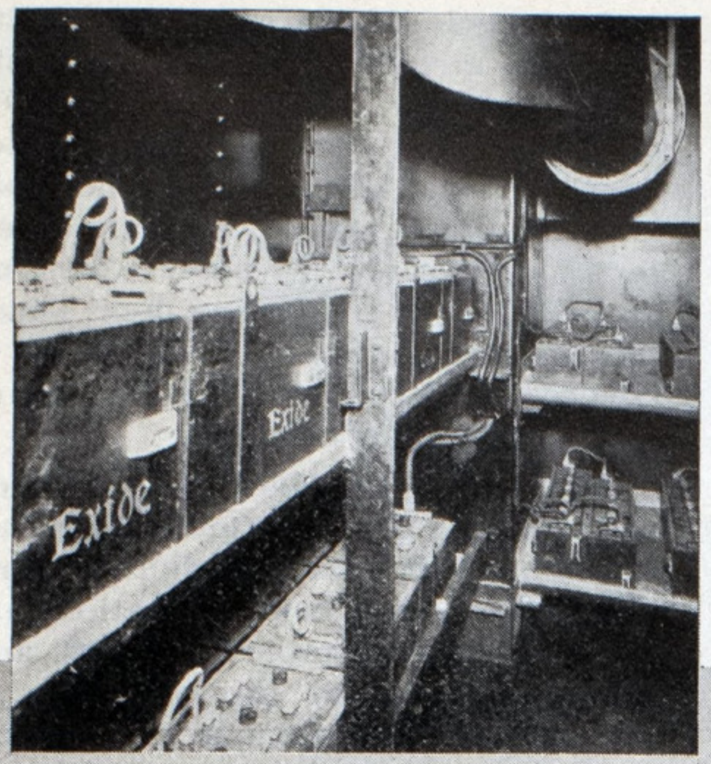
New Rope and labor are only partial costs of a rope change. Idle time of men, trucks, drills, shovels, hoists or whatever equipment is dependent upon Wire Rope directly or indirectly is costly . . . the chargeable expense of a premature failure and subsequent replacement. Wire rope users must have a product of quality and dependability. Wickwire Spencer Wire Rope is Quality Wire Rope. It is scientifically correct . . . its entire manufacture is under one control. The resulting uniformity and durability makes it long lived . . . the economical wire rope to use.



WICKWIRE SPENCER
WISSCO PRODUCTS

WICKWIRE SPENCER STEEL COMPANY, 41 East 42nd Street, New York City;
Buffalo; Chicago; Detroit; Philadelphia; Worcester; Tulsa, 314 East Archer Street;
Pacific Coast Headquarters: San Francisco; Branches and Warehouses: Los Angeles,
Portland, Seattle. Export Sales Department: New York City.

WIRE ROPE *by Wickwire Spencer*



ON GUARD THRU EVERY WATCH

NEWEST SOVEREIGN OF THE PACIFIC, *S. S. Mariposa, heading out of the Golden Gate. This ultra-modern vessel owned by the Matson Navigation Company takes no chances with her emergency electric current supply. She stows Exides. Her builders are the Bethlehem Shipbuilding Corp., Quincy, Mass. (Top above)* READY TO GO INTO ACTION *at any time. Battery room aboard the "Mariposa," where Exides stand guard through every watch.*

Exide Marine Batteries protect vital spots of $8,000,000 Matson Liner "Mariposa" —emergency electric current certain

THE S. S. Mariposa carries 5,000 tons of freight and 700 passengers. A precious cargo. Not one to take even the smallest kind of chance with. The Matson Steamship Navigation Company doesn't. Emergency electric current for her vital spots are guarded by Exide Marine Batteries . . . through every watch, from San Francisco to Sydney, Australia.

There is a 60-cell Exide ready at a second's notice to furnish emergency current for lights, radio, telegraph, bilge pump, water-tight doors. A heavy load for any battery to handle. But Exides do it. They're built for it . . . seagoin' from stem to stern. Interior communication, fire alarm, annunciator and other various services are supplied by additional low-voltage system Exide Marine Batteries.

Also, two motor lifeboats each carry a 6-cell Exide-Ironclad Marine Battery. The battery furnishes power for radio transmitting and receiving sets and lights.

Exide Marine Batteries aboard mean safety and absolutely dependable battery performance for ships of any size. Learn more about the many applications of Exide Batteries in Marine Service. Write for Bulletin—Form 3420. No obligation, of course.

Exide

MARINE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

TIRELESS STEVEDORES

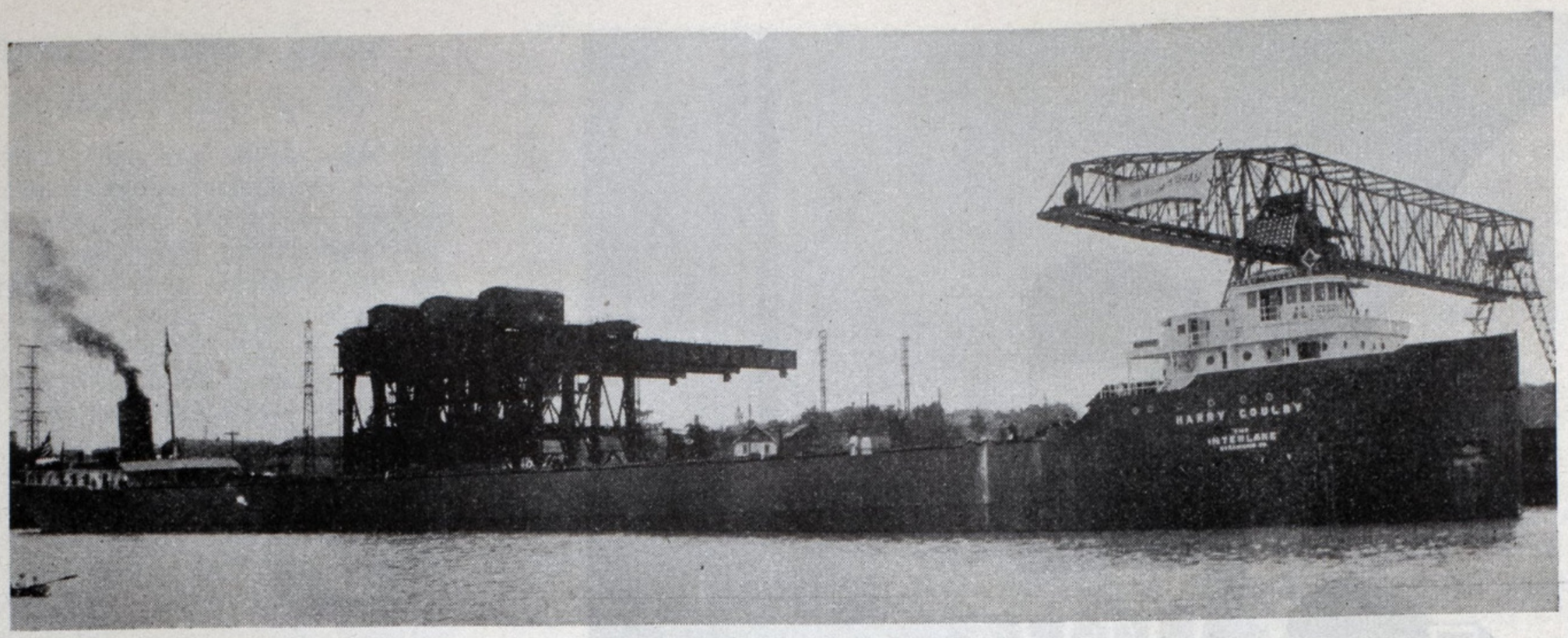
JUST throw the switch—and tireless stevedores attack the cargo of the all-electric ship. • Winches, powered by G-E motors and guided by G-E controllers, swing giant bundles between hold and dock. No waiting, no dissipation of unused power; just efficient methods applied to loading and unloading. • For the power plant of the ship has energy to spare. It feeds auxiliaries above deck, below deck, from pilot house to galley. In truth, electricity is vital to the operation of the modern vessel. • General Electric has designed and built electric equipment for ships which range from tugs to ocean liners. Its engineering experience and extensive facilities for manufacture and service are always available to a progressive maritime industry.

JOIN THE "G-E CIRCLE"—SUNDAYS AT 5:30 P.M. E.S.T. ON N.B.C. NETWORK OF 54 STATIONS—WEEKDAYS (EXCEPT SATURDAY) AT NOON

231-28

GENERAL ELECTRIC

MARINE EQUIPMENT

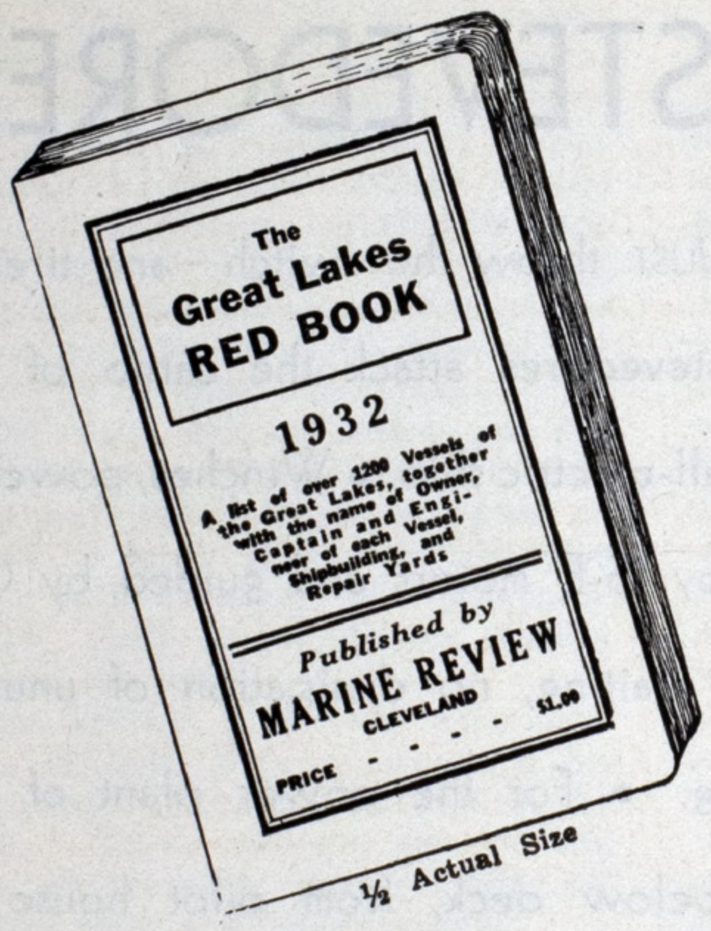


Announcing the–

1932

(29th Annual Edition)

GREAT LAKES RED BOOK



½ Actual Size

Issued just before the start of navigation on the Great Lakes the RED BOOK for 1932 will contain the carefully compiled and up-to-date information about the vessels, and the companies operating them, that has made it for years the most widely used and best known directory on the Great Lakes.

It is convenient, VEST-POCKET size and is used daily by captains, engineers and others aboard ship, and by executives of operating companies.

Business on the Great Lakes is constantly growing. Millions of dollars are spent in the operation and repair of the vessels which comprise the Great Lakes Fleet. The RED BOOK reaches the men who own and operate this vast fleet in a way possible for no other directory.

Space reservations are now being made and the cost is low. We'll gladly give you full details.

1. It has a complete alphabetical index giving the names of lake vessels.
2. It contains a complete, alphabetical list of every vessel owner and operator; name of the master and engineer of each ship; name of every marine superintendent, fleet captain, fleet engineer or other directing heads of each fleet.
3. It gives capacity of the Lake vessel at about 19′ draft,—each ship named in alphabetical order.
4. It contains a complete directory of the shipbuilding and ship repair yards serving shipping on the Great Lakes, with the names of the chief officials of each yard and description of facilities.
5. It has a port directory and classified buyers' guide in which each advertiser is listed geographically and according to product. This also provides an inexpensive means for the advertising of stores and ship chandlers, located at Lake ports, who sell to Lake ships.

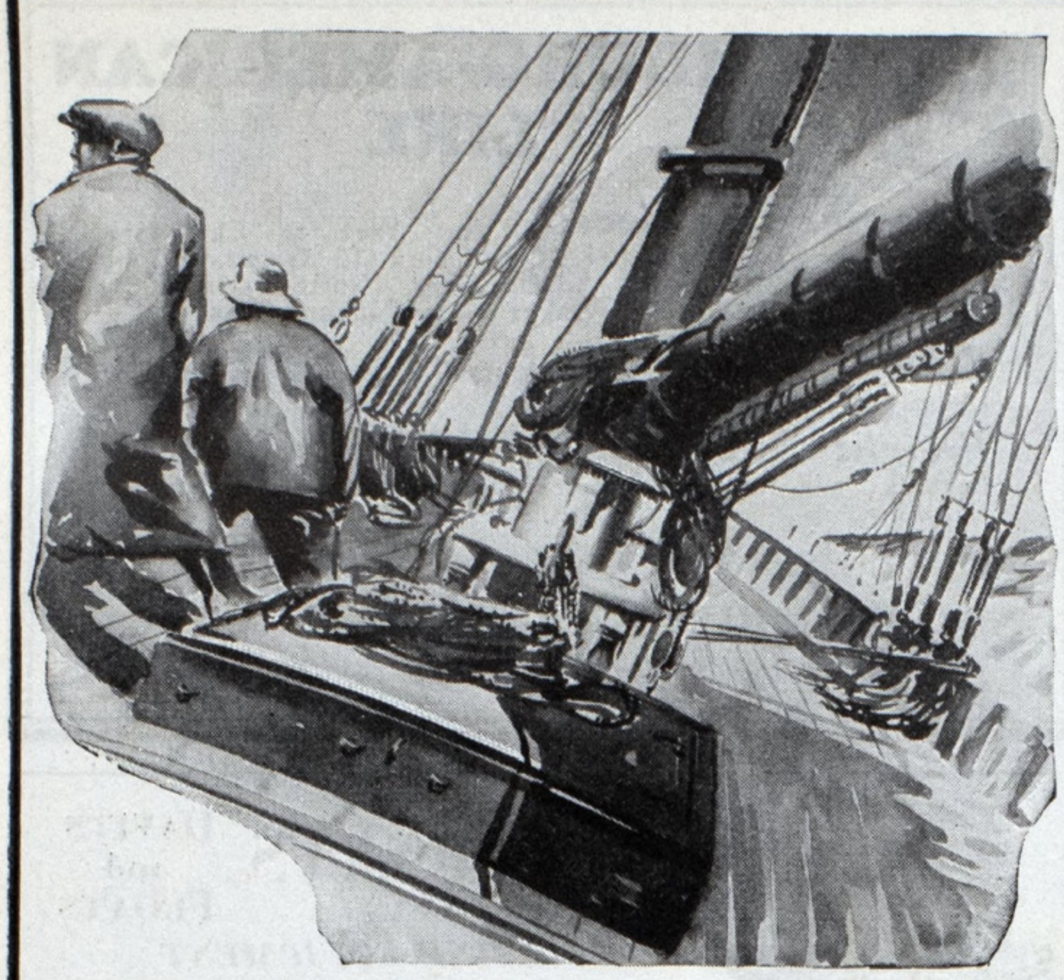
GREAT LAKES RED BOOK
Published by MARINE REVIEW
PENTON BUILDING

NEW YORK
220 Broadway

CLEVELAND
A.B.C. member A.B.P.

CHICAGO
Peoples Gas Bldg.

126-M 127 M.



"Then Ho for the sea so damp and free"

Deep sea sailormen realize that in a well-caulked tight bottom lies not only the welfare of the vessel and the crew but the safe delivery of the cargo.

For a hundred years,

STRATFORD OAKUM

has been keeping the ocean out of the finest ships that sail. Sailors depend on Stratford Oakum because they know it is the best.

Stratford Oakum is most economical to use. Wastage is very small, less labor is required to spin and caulk and it "stays put," whether in deck, side or bottom.

Seams right-caulked with Stratford Oakum will stay tight longer than when any other material is used.

Be sure you get Stratford Oakum

George Stratford Oakum Company

Jersey City, New Jersey

Also Manufacturers of Cotton Wiping Waste

*5

SAMSON SPOT

Log Lines

Smooth, tough and durable; no adulterating material to stiffen it and decrease strength and durability. Solid braided of extra quality cotton yarn. Uniform in size and quality. Easily identified by the colored spots, our trade mark.

We also manufacture flag halyards, lead lines, tiller rope; solid braided cotton cord in all sizes for various marine uses. Ask for catalog and samples.

Trade Mark Reg. U.S. Pat. Off.

SAMSON CORDAGE WORKS

89 BROAD STREET BOSTON, MASS.

TRADE MARK

Propeller Wheels and Blades

to fit any hub.

Sheriffs Manufacturing Co.

Established 1854

Milwaukee. Wis.

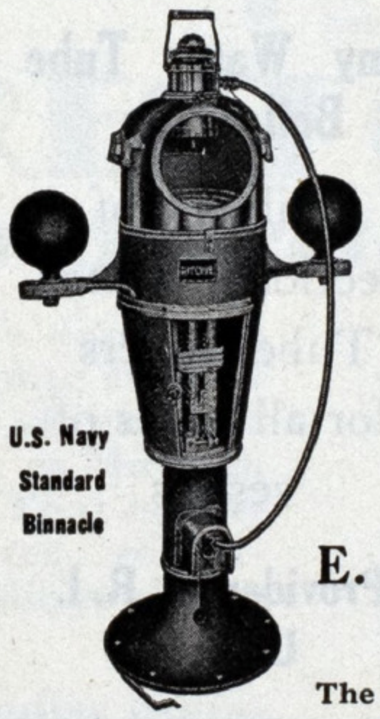
E. H. READING PROPELLER WHEELS

Machinery Repairs

226 Ohio St.

BUFFALO, N. Y.

'Phone Washington 5361



U.S. Navy Standard Binnacle

THE RITCHIE LIQUID COMPASS

The Standard Liquid Compass the world over.

Used Exclusively in U. S. Navy for over 40 years.

Over 65,000 on Merchant Vessels in all parts of the world.

Made in all sizes 2 to 12" dia.

Magnets for adjusting Purposes.

E. S. RITCHIE & SONS

Brookline, Mass., U. S. A.

Agents for the Great Lakes,

The Upson-Walton Company, Cleveland, Ohio

MANITOWOC SHIPBUILDING CORPORATION

Designers and builders of steel passenger and freight vessels, oil tankers, carferries, self unloaders, sand suckers, yachts, dredges, derricks, barges, scows, fire boats, lighters, tugs, marine engines, marine boilers, etc.

Excellent dry docking facilities for quick and economical repairs.

MANITOWOC, WISCONSIN

Classified Advertisements

FOR SALE

WOODEN TOW BARGE N. C. HOLLAND. 187′ Keel 32′ Beam 11′ 2″ Depth.

O. W. Blodgett, Bay City, Mich.

FOR SALE

One General Electric 7 K.W., D.C. Generating Set. For particulars write Petoskey Transportation Company, Petoskey, Michigan.

FOR SALE

3½ K.W., D.C. Engberg Steam driven generator. Complete with switchboard.
—Gardner duplex steam pump, water cyc. 3″ x 5″—, steam cyc. 5″ x 5″.
—Hughes duplex steam pump, water cyc. 4″ x 6″—, steam cyc. 6″ x 6″.
Northern Engineering & Equip. Co.
Benton Harbor, Michigan.

FOR SALE

WOODEN TOW BARGE PESHTIGO 201′ Keel 37′ Beam, 12′ Depth.
O. W. Blodgett, Bay City, Mich.

BIDS WANTED

U. S. Engineer Office, First New Orleans District, Poland and Dauphine Sts., New Orleans, La.—Sealed bids, in duplicate, will be received until 3 P. M. February 10, 1932, and then publicly opened, for furnishing all labor and materials and performing all work for constructing and delivering one steel, non-propelled, spray boat. Further information furnished on application.

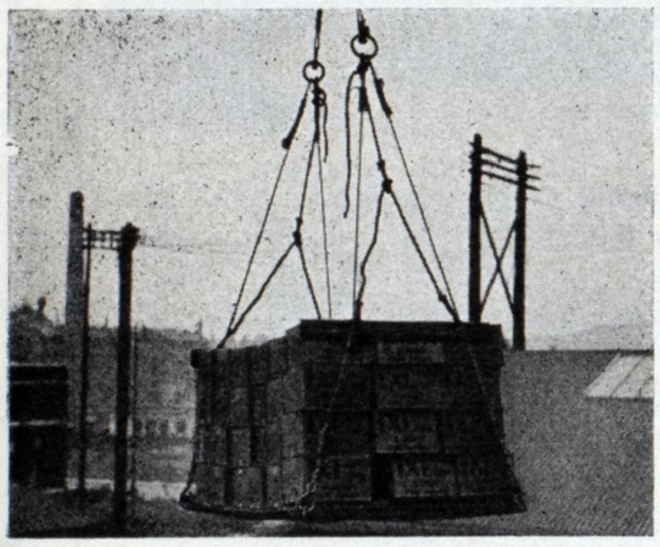
HAVE YOU A BOAT OR EQUIPMENT FOR SALE?

The classified section of MARINE REVIEW is for your convenience—its value is proving worthwhile to everyone who uses it to buy and sell.

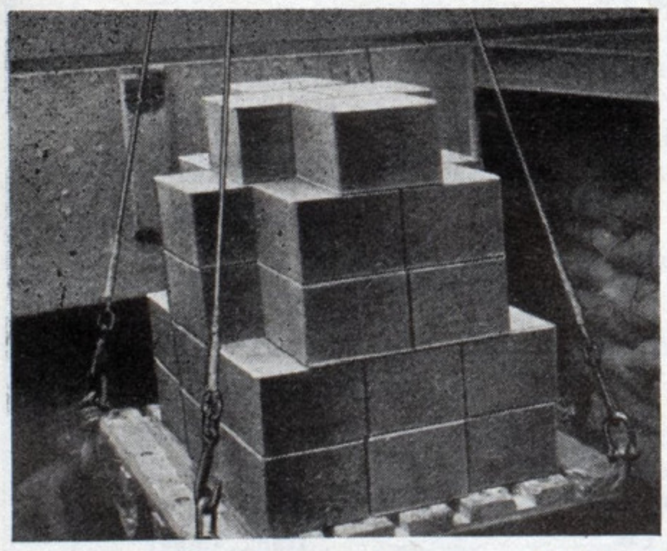
If you want to buy or sell ships or marine equipment—need a man for your organization—make it known to the entire marine industry through the use of classified advertising in MARINE REVIEW.

Mail copy for your advertisement in the March issue today, so it reaches us before February 20.

● A preferred sling type. Note how spreader bars keep bridle ropes away from cases.



● A sling popular in Europe. Metal spreaders are used for protection.



● This sling requires a pyramided load, and with careful stacking is quite safe, but the entire load may go adrift from wind or jar.

CORRECT GEAR • • •
-an important claim preventative

Probably as much damage is occasioned to shipping cases of all sorts by the use of incorrect loading equipment as through any other means. That is why Efca representatives recommend the type of slings shown on this page.

Use of this or similar equipment is now standard with most large steamship andstevedoring companies. Thus, another source of damage and claims is being eliminated.

Efca SERVICE extends to all export shipping for which Efca fibreboard cases are used. You pay nothing for it. Efca is supported by the leading fibreboard case manufacturers who make up its international membership.

Export Fibreboard Case Association

Specify Efca Cases

An International Association of Leading Fibreboard Case Manufacturers.

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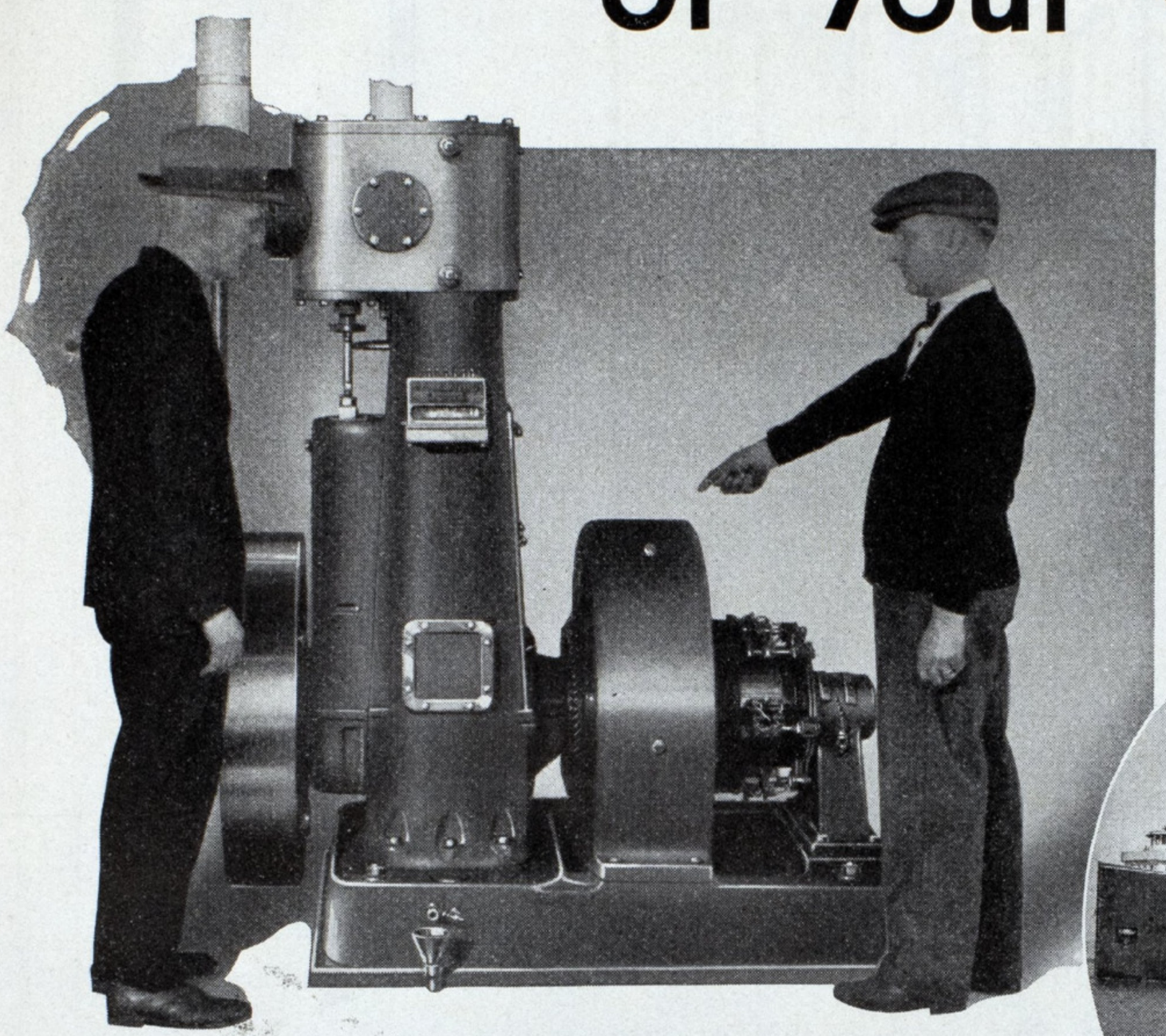
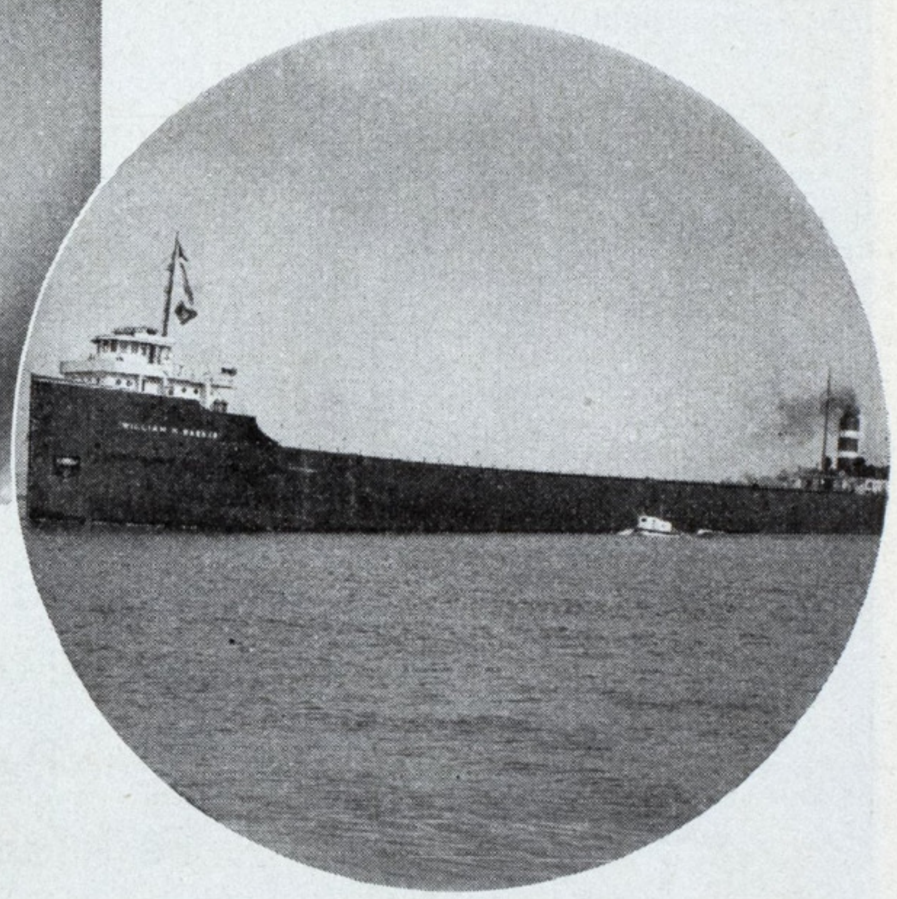
INDEX TO ADVERTISERS

A Valuable Member of Your Crew



SS. WILHELM H. WARNER *equipped with Troy-Engberg generating sets, built for G. A. Tomlinson, by American Shipbuilding Company.*



MANY a Chief Engineer points with pride to his Troy-Engberg Generating Set when the Fleet Engineer makes his inspection and compliments the chief on his low cost record.

We have found chief engineers very willing to give full credit to their Troy-Engberg installation. They are indeed grateful to these faithful performers, which function silently day in and day out, year after year, without variations or trouble. Troy-Engberg Generating Sets have an impressive record for faithful service . . . and why not?

Years of knowing the requirements of Marine service are responsible for the generous design, accessibility, trouble-proof construction of these sets—only the best materials obtainable are used in their construction.

They are designed to give constant trouble-free service and to *lower costs* and *keep them down.*

Fleet operators and fleet engineers notice the difference (in dollars) on ships equipped with Troy-Engberg Generating Sets.

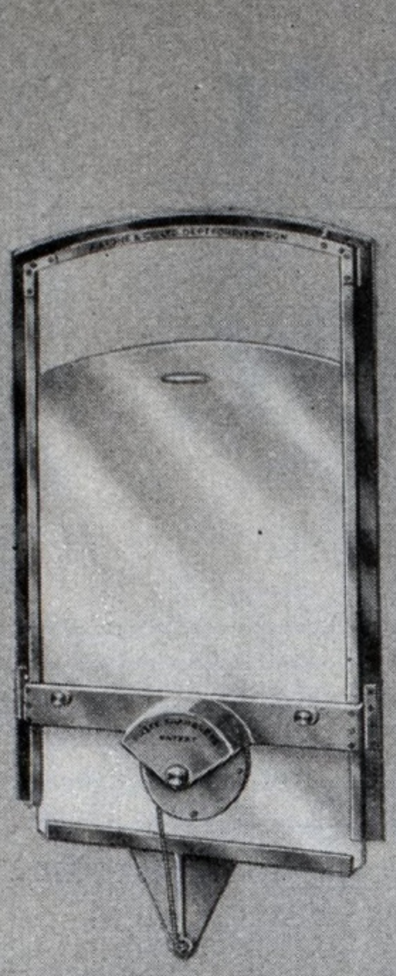
Valuable data on these Marine Generating Sets is available to you for the asking. Write us for it, you incur no obligation by doing so.

TROY ENGINE & MACHINE COMPANY
RAILROAD AVE., TROY, PENNSYLVANIA

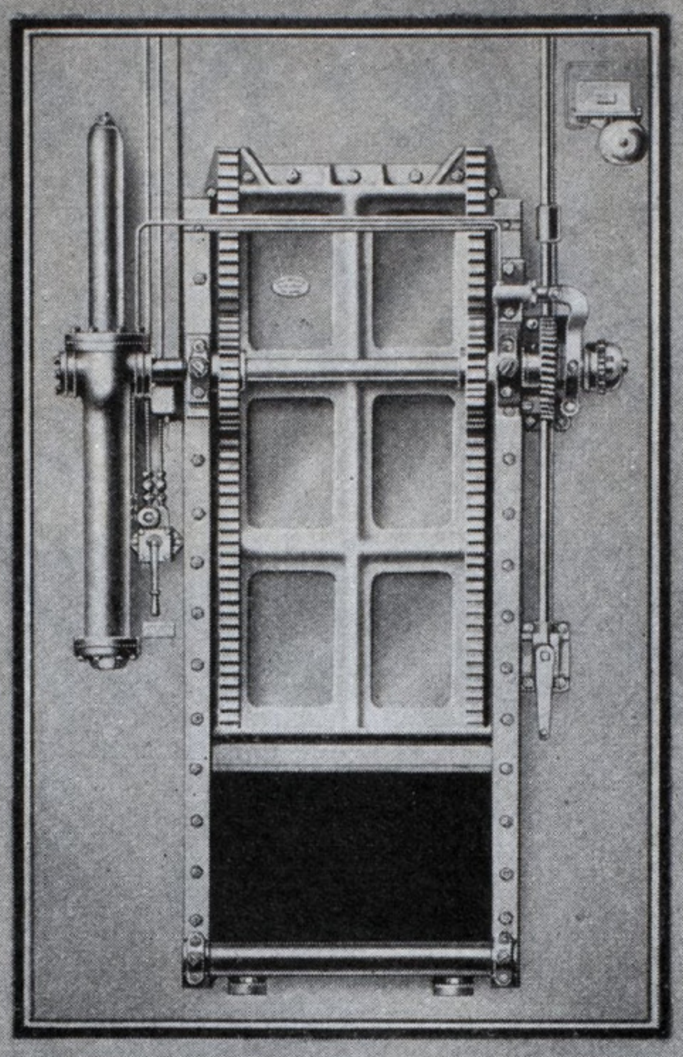
TROY-ENGBERG

MARINE GENERATING SETS, DC OR AC • GENERATORS • STEAM ENGINES

M-32-1

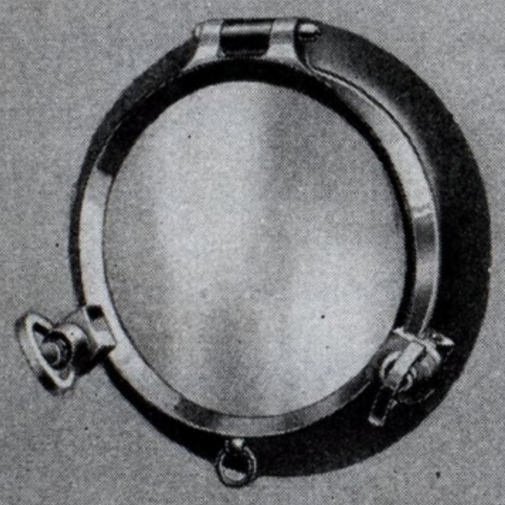


W-60 — "Fusee" Spring Balanced Weathertight Window



A Bulkhead Door in the "Stone System" of Hydraulically Controlled Bulkhead Doors

W-61 — "Fusee" Spring Balanced Watertight Window



S-59—Direct Pressure Sidelight

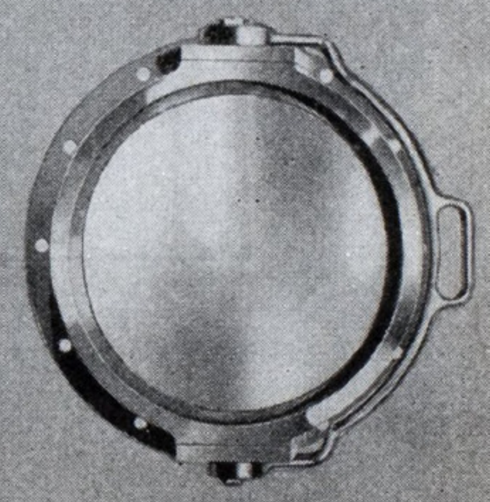
Marine Specialties

The world-known marine specialties of J. Stone & Co., Ltd., are manufactured and sold in this country by AMERICAN LOCOMOTIVE COMPANY.

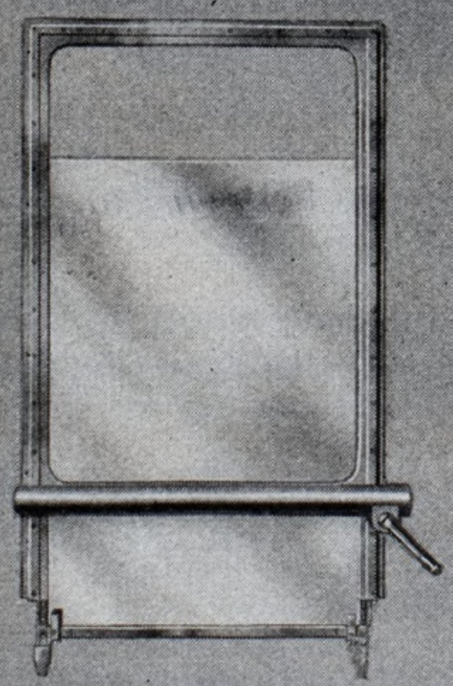
Stone Design, Alco Workmanship and the Manufacturing Facilities of American Locomotive Company make an exceptional combination.

This combination presents an attractive opportunity to the American Shipping Industry to buy marine specialties of unquestioned quality and sea-tested performance at production prices.

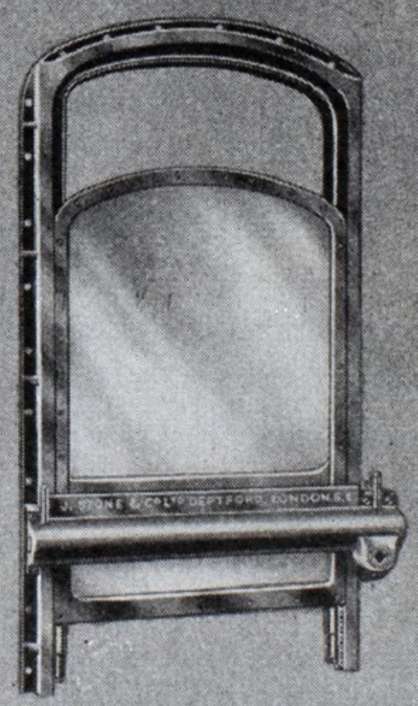
Write for descriptive pamphlets, or ask our representative to call.



S-80—Stirrup Type Pivoted Sidelight



W-102—Rack and Pinion Type Weathertight Window



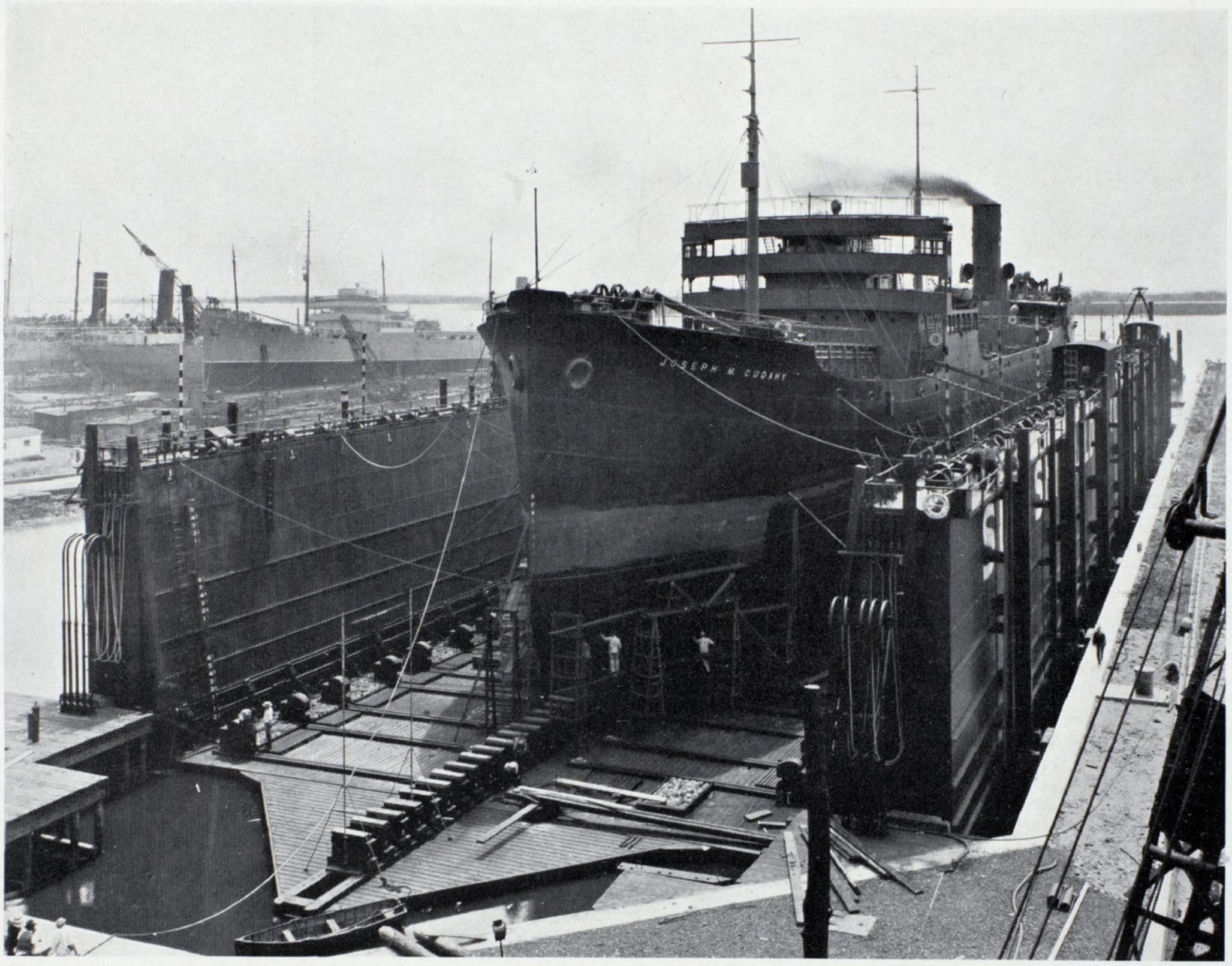
W-1—Rack and Pinion Type Watertight Window

AMERICAN LOCOMOTIVE CO.

30 Church Street, New York, N. Y.

Rialto Building — San Francisco

MARINE REPAIRS



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11,000 Tons Capacity Each

Diesel or Steam Engine Repairs

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